

REGO *LP-Gas & Anhydrous Ammonia Equipment Buyer's Guide L-102*

ECI *Engineered Controls
International, Inc.*

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Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH₃). 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 NH₃ 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 NH₃ 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 NH₃ service (i.e., they have stainless steel materials).

NOTE: Because this catalog is a condensed “Buyer’s Guide,” much critical technical and application data is omitted. Additional technical and application information is available in ECII® Catalog L-500, as well as in a variety of other ECII® publications. Additional information may be obtained from Engineered Controls International, Inc. or Authorized Product Distributors.

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH₃. 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.

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 — 1 st week
B — 2 nd week
C — 3 rd week
D — 4 th week
E — 5 th 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	02 — 2002
03 — 2003	etcetera. . .

EXAMPLE: 6A92 = First week of June, 1992

Regulator Color Coding

ECII® Domestic first stage, second stage, single stage, and integral twin stage LP-Gas regulators are easy to identify. In addition to the standard part number marking which indicates the proper application, each regulator is color coded 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.

Classic Gold — Indicates a single stage regulator that is designed to be used alone in single stage systems.

Brilliant Red — Denotes a first stage high pressure regulator, normally used in two-stage applications in conjunction with a select brown second stage regulator.

Select Brown — Signifies second stage low pressure regulators, designed for use in two-stage systems in conjunction with a brilliant red high pressure regulator — also signifies integral twin stage regulators designed to provide benefits of two-stage regulation in one compact unit.

Select Blue — Indicates a second stage 2 PSIG delivery pressure regulator and a line pressure regulator downstream to reduce 2 PSIG to appliance pressure

Green — High pressure pounds to pounds anhydrous ammonia regulator.

Limited Warranty and Limitation Of Liability

LIMITED 10 YEAR WARRANTY AND LIMITATION OF LIABILITY

LIMITED 10 YEAR WARRANTY

Engineered Controls International, Inc. ("ECII") warrants to the original purchasers the 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 10 years from the date of manufacture. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies in writing and ships the product to ECII at 100 Rego Drive, Elon, NC 27244, ECII, at its option, and within forty-five days of receipt, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by ECII to be defective. Failure of buyer to give such written notice and ship the product 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 continuously after installation in accordance with ECII'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, failure to maintain, or neglect, nor does it extend to any product or part which has been modified, altered, disassembled, or repaired in the field. This warranty does not cover any cosmetic issues, such as scratches, dents, marring, fading of colors or discoloration.

Except as expressly set forth above, and subject to the limitation of liability below, ECII 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. ECII disclaims all warranties not stated herein.

LIMITATION OF LIABILITY

NOTICE TO USERS OF PRODUCTS

The Limited Warranty stated above is a factory warranty to the first purchasers of ECII products. Since most users have purchased these products from ECII distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing and return the product to the distributor from whom he purchased the product/part. The distributor may or may not at the distributor's option choose to submit the product/parts to ECII, pursuant to this 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 ECII's distributor for replacement or repairs under the terms of ECII's Limited Warranty in no way determines ECII's obligations under this Limited Warranty.

Because of a policy of continuous product improvement, ECII reserves the right to change designs, materials or specifications without notice.

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.

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)	LV3403TR
	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.

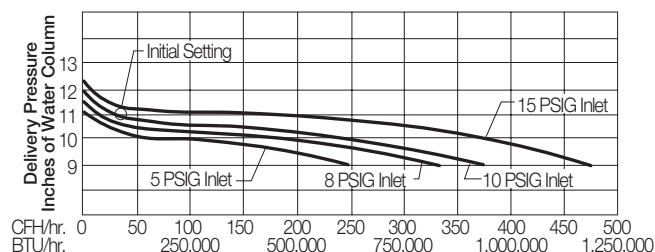
All give you a product that provides accurate gas delivery under varying pressure ranges and load conditions.

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.

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.

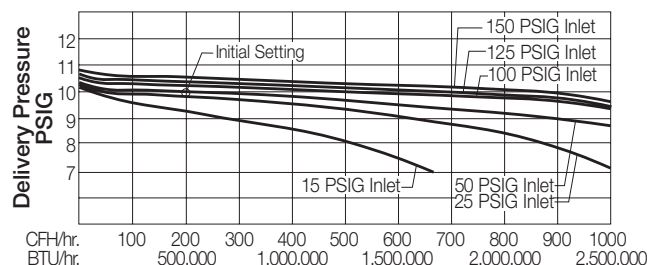
LV4403TR Series First Stage Regulator



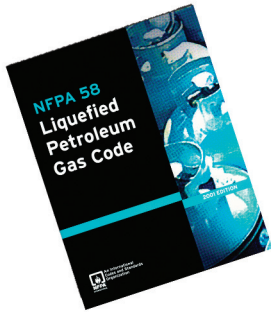
Example for a Second Stage Regulator

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 - 2001 Edition, "Liquefied Petroleum Gas Code" states in Section 1.5 that, "persons who transfer liquid LP-Gas, who are employed to transport LP-Gas, or whose primary duties fall within the scope of this code 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.

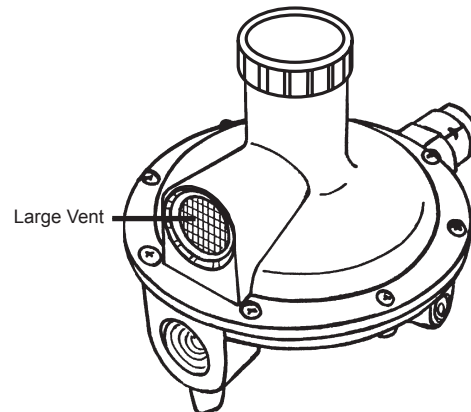
The Causes of High Pressure Gas in a System are:

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:

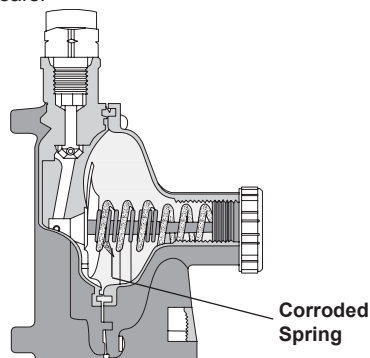
Adjusting springs and relief valve springs can rapidly corrode if exposed to salt air or industrial pollution. Even moisture condensation on these springs can cause them to rust and fail.

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.



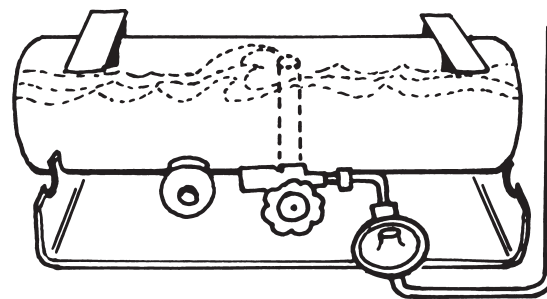
A casual inspection for corrosion can be made by examining the surface and looking into the bonnet after the bonnet cap has been removed. This sometimes will alert the inspector to corrosive conditions. Certainly the regulator should be examined in more detail by a qualified and trained technician. For 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.

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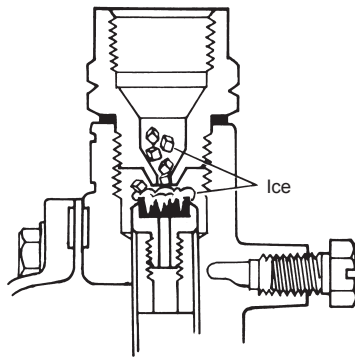
If any corrosion is evident, replace the regulator.

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.

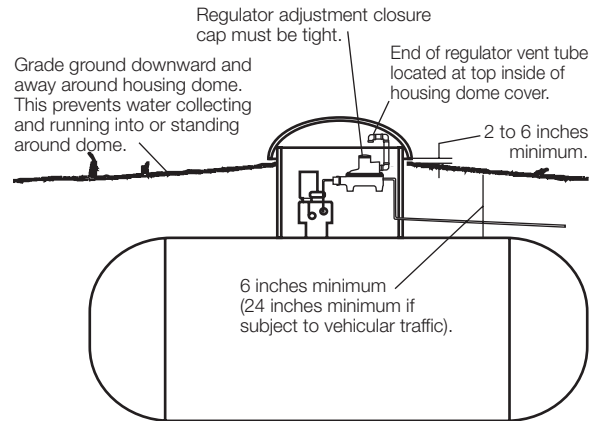
Action Required: All LP-Gas should be checked for moisture content prior to delivery to consumers and proper amounts of anhydrous methanol added if the gas cannot be returned to the supplier. Any container suspected of having excessive moisture should be treated with the proper amount of methanol.

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

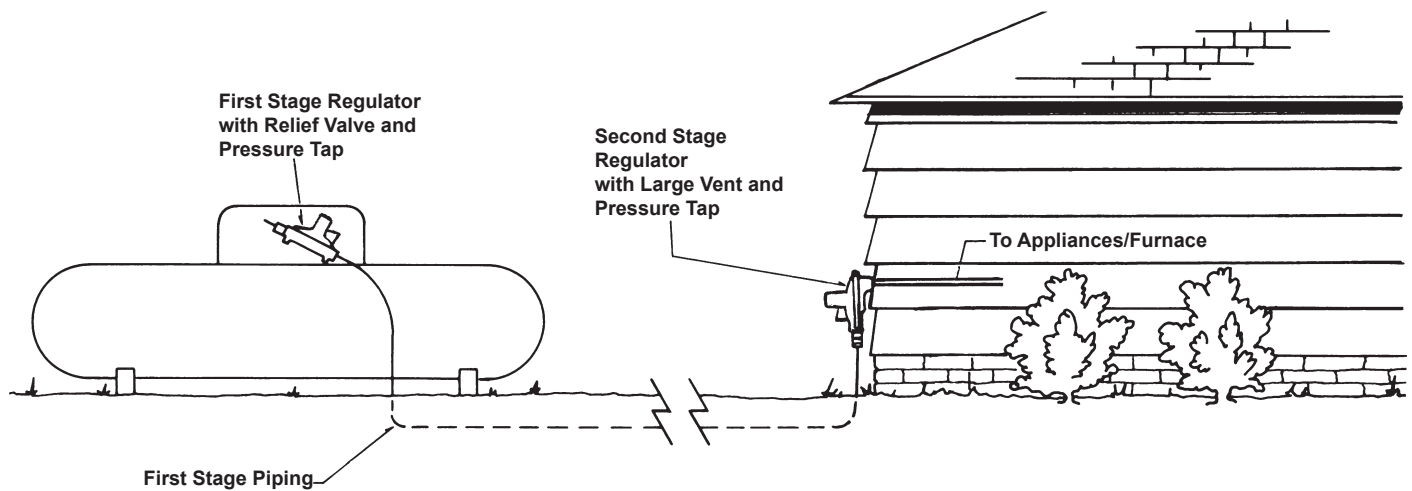
All ECII® Products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber. As a general recommendation, Regulators should be replaced in accordance with all of the recommendations outlined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

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 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.

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.

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

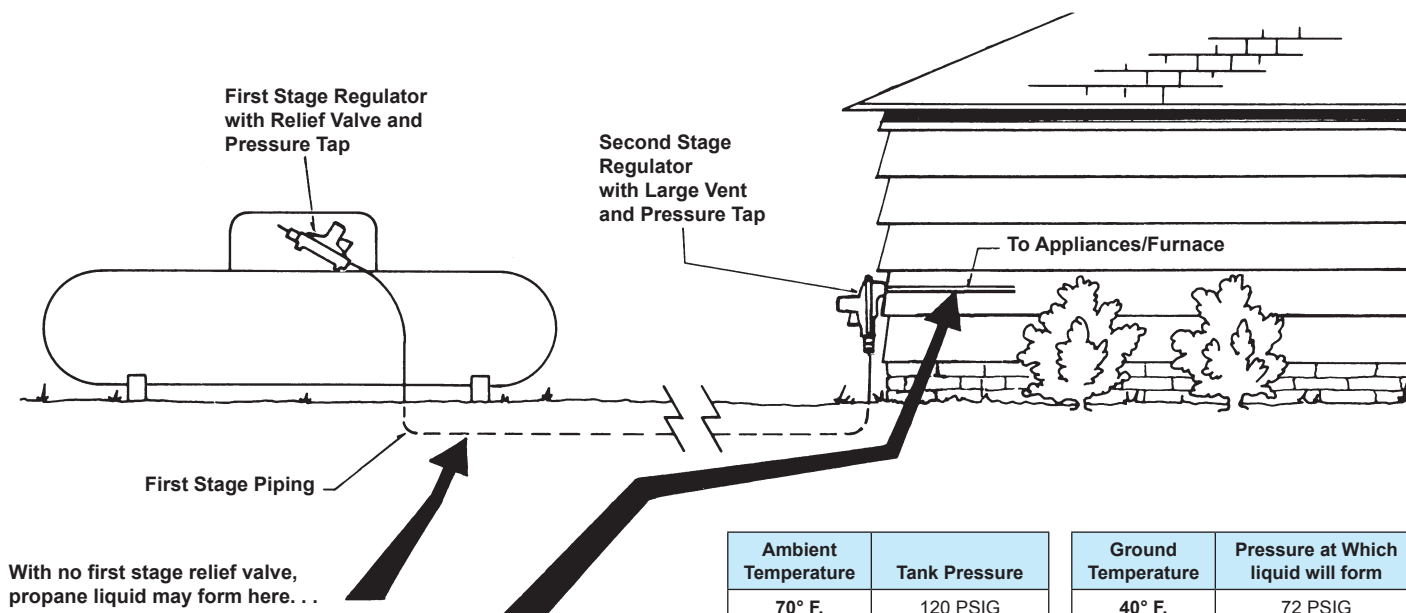
A high degree of flexibility is offered in new installations of two-stage systems. Appliances can be added later to the present load – provided the high pressure regulator can handle the increase – by the addition of a second low pressure regulator. Since appliances can be regulated independently, demands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

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



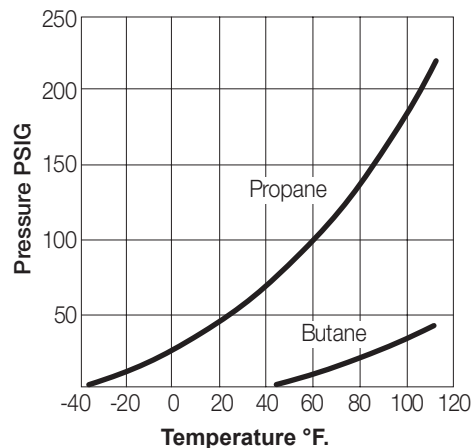
Resulting in sudden pressure surge due to flashing into vapor here! First stage relief can prevent liquid from forming in first stage piping during periods with no gas demand! !

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



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

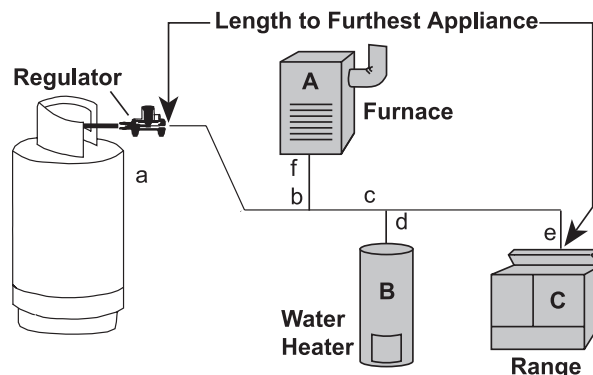
Rego® LV4403 Series First Stage Regulators with Built-In Relief Valves reduce the possibility of this serious hazard in two stage applications. The built-in relief valve is designed to vent as needed and reduce the possibility of first stage piping pressure from becoming high enough to form liquid.

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:

- 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.
- For second stage or integral twin stage piping:
 - Measure length of piping required from outlet of regulator to the appliance furthest away. *No other length is necessary to do the sizing.*
 - Make a simple sketch of the piping, as shown.
 - 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.
 - 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.
- For piping between first and second stage regulators
 - 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.
 - 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)

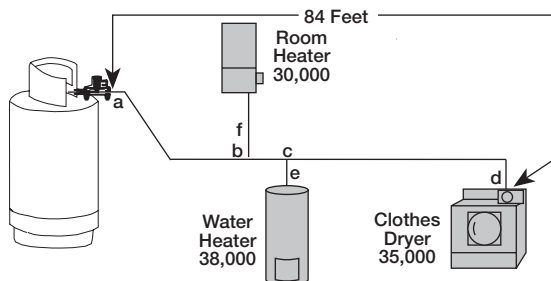
From a to b, demand = 38,000 + 35,000 + 30,000
= 103,000 BTU/hr; use 3/4" pipe

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

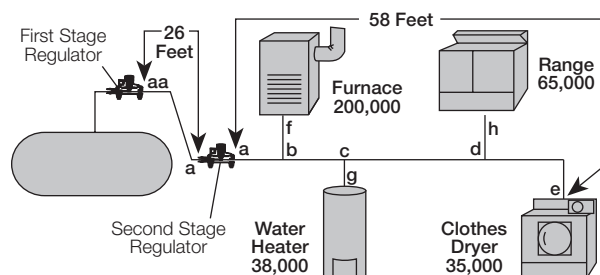
From c to e, demand = 38,000 BTU/hr; use 1/2" pipe or 5/8" tubing

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

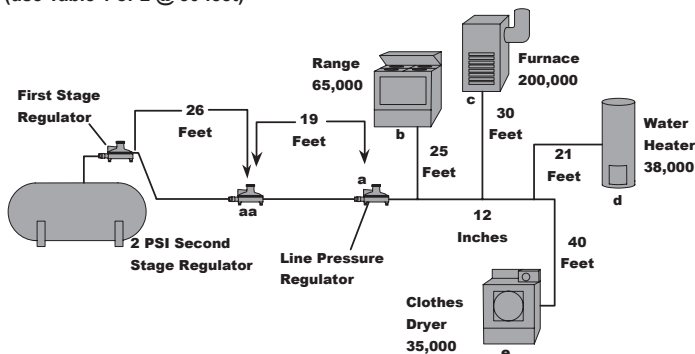
From Regulator a to each appliance:

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



Pipe and Tubing Selection Guide

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 Tubing (O.D.)	3/8	558	383	309	265	235	213	196	182	171	161	142	130	118	111	104	90	89	89	82	76
	1/2	1387	870	700	599	531	481	443	412	386	365	323	293	269	251	235	222	211	201	185	172
Pipe Size	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
1	1/2	3339	2295	1843	1577	1398	1267	1165	1084	1017	961	852	772	710	660	619	585	556	530	488	454
	3/4	6962	4799	3854	3296	2923	2649	2437	2267	2127	2009	1780	1613	1484	1381	1296	1224	1162	1109	1020	949
1-1/4	1	13153	9040	7259	6213	5507	4989	4590	4270	4007	3785	3354	3039	2796	2601	2441	2305	2190	2089	1922	1788
	1-1/2	27004	18560	14904	12756	11306	10244	9424	8767	8226	7770	6887	6240	5741	5340	5011	4733	4495	4289	3945	3670
1-1/2	1	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 stage 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 based on 1,200,000 BTU

First Stage Pressure PSIG

Multiply By

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
1	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 stage regulator or to inlet of second stage regulator furthest away.

First Stage Pressure PSIG

Multiply By

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 Tubing (O.D.)	3/8	49	34	27	23	20	19	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1/2	110	76	61	52	46	42	38	36	33	32	—	—	—	—	—	—	—	—	—	—
	5/8	206	151	114	97	86	78	71	67	62	59	—	—	—	—	—	—	—	—	—	—
	3/4	348	239	192	164	146	132	120	113	105	100	—	—	—	—	—	—	—	—	—	—
Pipe Size	7/8	536	368	296	253	224	203	185	174	161	154	—	—	—	—	—	—	—	—	—	—
	1	291	200	161	137	122	110	102	94	87	84	74	67	62	58	54	51	48	46	43	40
	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
1	30	4097	2560	2331	2012	1794	1457	1410	1256	1021	880	785	716	616	550
	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
3/8	13	72	50	39	34	30	28	23	20	19	17	15	15	14	11	9
	15	99	69	55	49	42	39	33	30	26	25	23	22	20	15	14
1/2	18	181	129	104	91	82	74	64	58	53	49	45	44	41	31	28
	19	211	150	121	106	94	87	74	66	60	57	52	50	47	36	33
3/4	23	355	254	208	183	164	151	131	118	107	99	94	90	85	66	60
	25	426	303	248	216	192	177	153	137	126	117	109	102	98	75	69
1	30	744	521	422	365	325	297	256	227	207	191	178	169	159	123	112
	31	863	605	490	425	379	344	297	265	241	222	208	197	186	143	129

*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 (Between 2 PSIG service regulator & line pressure regulator).

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 Tubing (O.D.)	3/8	451	310	249	213	189	171	157	146	137	130	104	89	79	72	66	61	58	54	49	45
	1/2	1020	701	563	482	427	387	356	331	311	294	236	202	179	162	149	139	130	123	111	102
Pipe Size	3/4	1900	1306	1049	898	795	721	663	617	579	547	439	376	333	302	278	258	242	229	207	191
	1	3215	2210	1774	1519	1346	1219	1122	1044	979	925	743	636	563	511	470	437	410	387	351	323
	1 1/4	2687	1847	1483	1269	1125	1019	938	872	819	773	621	531	471	427	393	365	343	324	293	270
	2	5619	3862	3101	2654	2352	2131	1961	1824	1712	1617	1298	1111	985	892	821	764	717	677	613	564
	2 1/2	10585	7275	5842	5000	4431	4015	3694	3436	3224	3046	2446	2093	1855	1681	1546	1439	1350	1275	1155	1063
1-1/2	1-1/4	21731	14936	11994	10285	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	26262	23787	21884	20359	19102	18043	14490	12401	10901	9959	9162	8523	7992	7554	6844	6292

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

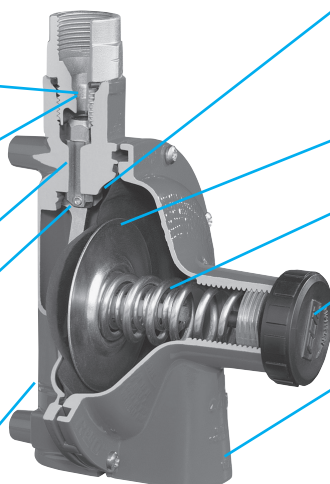
Provides quick response to diaphragm movement; moves directly perpendicular to nozzle orifice to meter gas flow, give positive closure and reduce seat disc wear.

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 3/4" 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 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

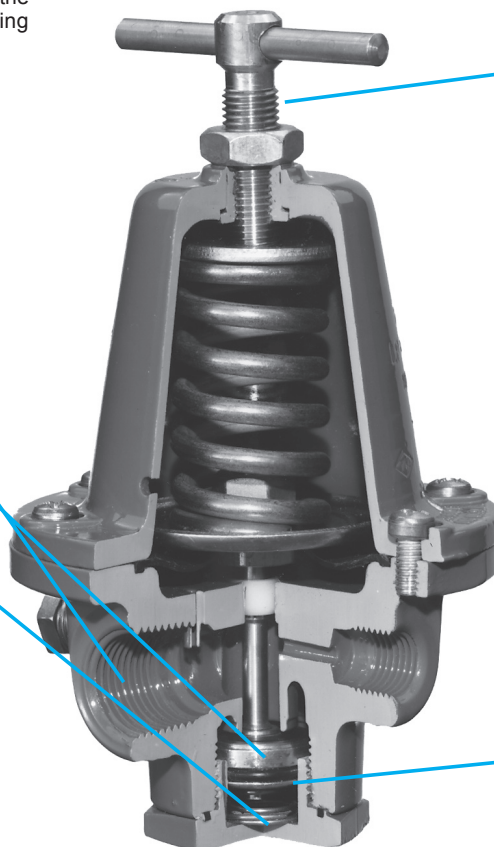
Machined and threaded into the body casting; also includes 1/4" NPT pressure gauge ports.

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

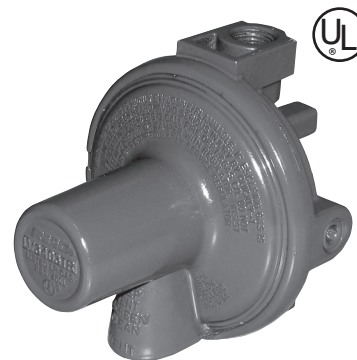
In those cases where there is a choice of delivery pressure ranges, the **lowest** spring range which will fulfill your requirements is recommended because the sensitivity of a regulator decreases as the range of the adjusting spring increases.

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.

Compact High Pressure First Stage Regulator

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.

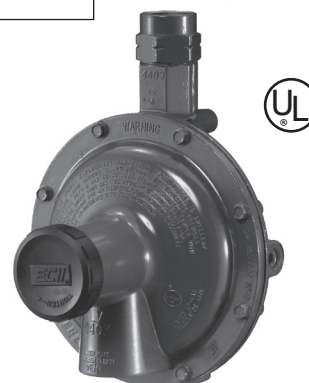


Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV3403TR	¼" F.NPT	½" F.NPT	¼"	10 PSIG	Over Outlet	1,500,000

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

High Pressure First Stage Regulators

Provides accurate first stage regulation in two-stage bulk tank systems. These regulators handle vaporization of tanks up to 1200 gallons. 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.



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			¾" F. NPT	5		
LV4403TR9		10			5-10		
LV4403SR96		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.

Second Stage Regulator For 2 PSIG Systems

Designed to reduce first stage pressure of 10 PSIG down to 2 PSIG. Systems that utilize this regulator use smaller than normal piping inside of the building. A special final stage regulator, not the appliance regulator, is required to reduce this intermediate 2 PSIG pressure down to 11" w.c.



LV4403Y Series



LV5503Y Series

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

Low Pressure Second Stage Regulators

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.

Backmount Design

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

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	1½"	#28 Drill	11" w.c. at 10 PSIG Inlet	9" to 13" w.c.	Over Inlet	935,000
LV4403B46							
LV4403B46R*							
LV4403B66	¾" F. NPT	¾" F. NPT	3/16"	11" w.c. at 10 PSIG Inlet	9" to 13" w.c.	Over Inlet	1,000,000
LV4403B66R*							
LV4403B66RA							
LV4403B66RAB							

* Backmount design

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

Low Pressure Second Stage Regulators

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.

LV5503 Series

LV6503 Series

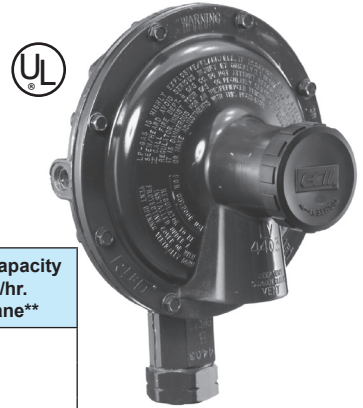
Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane
LV5503B4	½" F. NPT	¾" F. NPT	¼"	11" w.c. at 10 PSIG Inlet	9" - 13" w.c.	Over Inlet	1,600,000
LV5503B6	¾" F. NPT		1" F. NPT				"
LV5503B8		1½" F. NPT			1½" F. NPT	8½" - 14" w.c.	
LV6503B14	2" F. NPT	2" F. NPT	5⁄8"		9,750,000		

Low Pressure Second Stage Tobacco Barn Regulator

Especially developed for drying barns in the tobacco industry. The 2503G regulator will supply a steady and constant flow of fuel to as many as 12 to 20 burners throughout the barn.

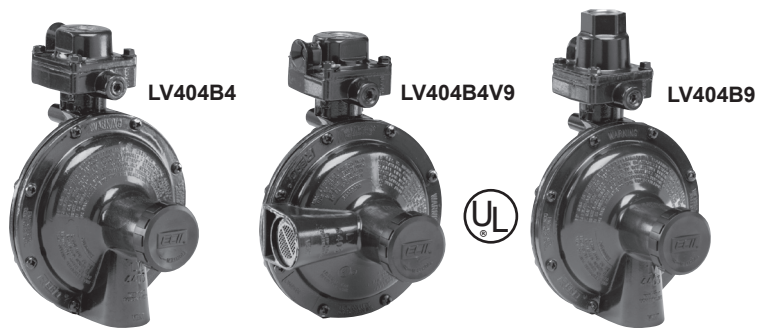
Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV5503G4	½" F. NPT	¾" F. NPT	¼"	15" w.c. at 15 PSIG Inlet	8" - 18" w.c.	Above Inlet	1,750,000

* Maximum flow is based on 15 PSIG inlet and 12" w.c. delivery pressure.



Compact Twin Stage Regulators

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.



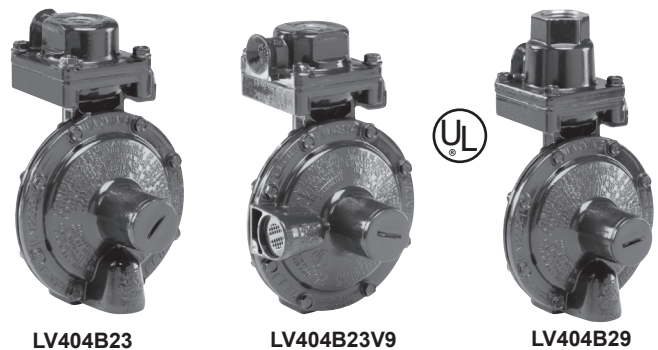
Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range 2nd Stage	Bonnet Vent Position 1st Stage	Bonnet Vent Position 2nd Stage	Capacity BTU/hr Propane*	Accessories	
									1st Stage Vent Pipe-Away	
LV404B4	1/4" F. NPT	1/2" F. NPT	.219	11" w.c. at 100 PSIG Inlet	9" - 13" w.c.	Down	Over Outlet	525,000		404PE
LV404B4V9		1/2" F. NPT				9 o'clock	9 o'clock			
LV404B46		3/4" F. NPT				Down	Over Outlet			
LV404B46V9		3/4" F. NPT				9 o'clock	9 o'clock			
LV404B9	F. POL	1/2" F. NPT				Down	Over Outlet			
LV404B9V9		1/2" F. NPT				9 o'clock	9 o'clock			
LV404B96		3/4" F. NPT				Down	Over Outlet			
LV404B96V9		3/4" F. NPT				9 o'clock	9 o'clock			

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

Compact Twin Stage Regulators

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.

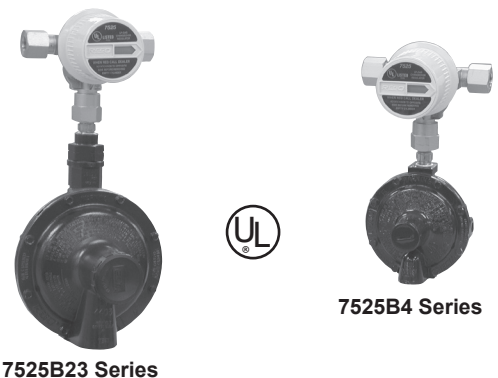


Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range 2nd Stage	Bonnet Vent Position 1st Stage	Bonnet Vent Position 2nd Stage	Capacity BTU/hr Propane*	Accessories		
									1st Stage Vent Pipe-Away	2nd Stage Vinyl Cover	Bracket
LV404B23	¼" F. NPT	½" F. 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										
LV404B29V9	F. POL										

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

Twin Stage Automatic Changeover Regulators

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.



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		1/4" Inverted Flare	1/2" F. NPT	11" w.c.	9"-13" w.c.	over outlet	2503-22A	450,000

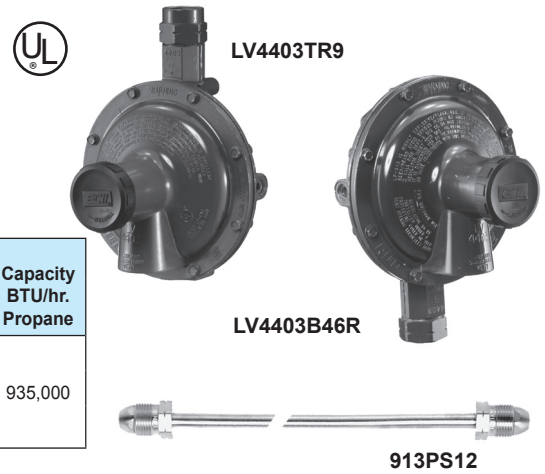
* Set at 100 PSIG inlet pressure.

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

Two Stage Regulator Outfits

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

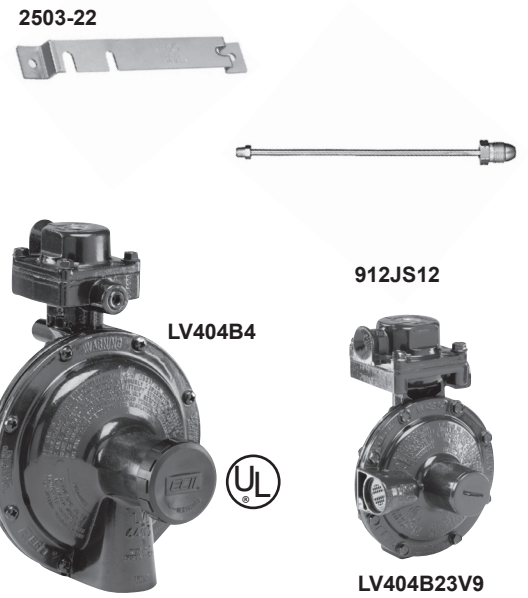
Kit Number	1st Stage Regulator Included		2nd Stage Regulator Included		Bracket Included	Pigtail Included	Capacity BTU/hr. Propane
	Part Number	Inlet x Outlet Female	Part Number	Inlet x Outlet F. NPT			
5807	LV4403TR9	POL x ½" NPT	LV4403B4	½" x ½"	2503-22	913PS12	935,000
5808			LV4403B46R	½" x ¾"	Not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



Twin Stage Regulator Outfit

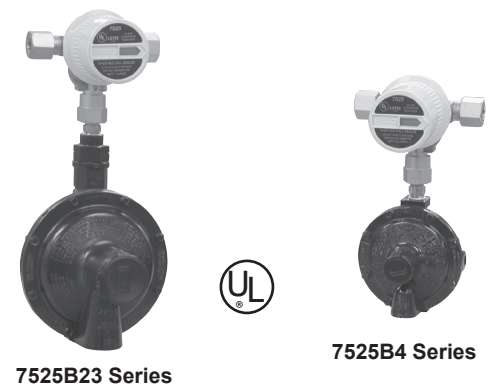
This outfit contains the equipment required to provide twin-stage regulation.

Kit Number	Twin Stage Regulator Included	Inlet F. NPT	Outlet F. NPT	Pigtails Included	Capacity BTU / hr. Propane
5828	LV404B4	1/4"	1/2"	912JS12	525,000
5832	LV404B23V9				200,000



Automatic Changeover Regulator Outfits

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



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		

Compact Regulators

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.



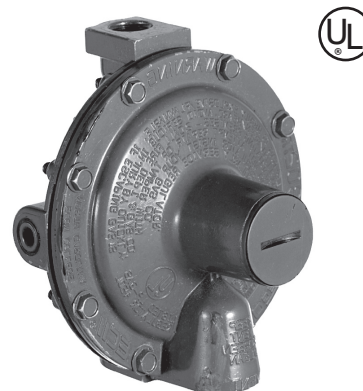
302V

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	¼" F. NPT	¼" F. NPT	No. 50 Drill	15 PSIG at 100 PSIG inlet	Not Adjustable	Small Vent	125,000
301S		Soft M. POL w/60 DMS orifice						
302	Single Stage	¼" 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					Drip Lip Above Inlet	
302V		¼" F. NPT					Drip Lip at 9 o'clock	
302V9		¼" F. NPT						
302V9LS		Soft POL w/o orifice						

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

Low Pressure Single Stage Regulators

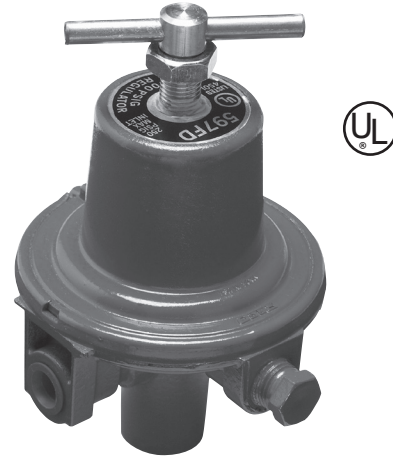
A compact, sturdy regulator incorporating many of the quality features found in larger domestic regulators. Ideal for outdoor LP-Gas grills. The regulator reduces cylinder pressure down to burner pressure, normally 11" w.c. It is intended for use on small portable appliances that use 100,000 BTU's/hr.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



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	3/8" F. NPT	No. 49 Drill	11" w.c. at 100 PSIG Inlet	9"-13" w.c.	Over Outlet	150,000
LV2302P	M. POL						

High Pressure Industrial / Commercial Pounds-to-Pounds Regulators

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.



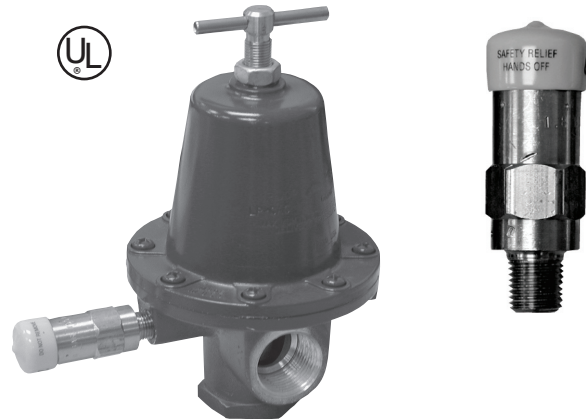
Part Number	Adjustment Method	Inlet Connection	Outlet Connection	Recommended Delivery Pressure Range (PSIG)	Capacity Determined at Set Pressure of PSIG*	Capacity BTU/hr. Propane**
597FA	Tee Handle	1/4" NPT	1/4" NPT	1-15	10	1,750,000
597FB				10-30	20	3,000,000
597FC				20-45	30	3,500,000
597FD				40-100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

High Pressure Industrial / Commercial Pounds-to-Pounds Regulator Accessories

Designed for use as a relief valve on first stage regulators that comply with 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 separate relief valve.



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	15 PSIG				1725**
3139-38	38-PSIG	20 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.

High Pressure Industrial / Commercial Pounds-to-Pounds Regulators

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.



Part Number	Service	Adjustment Method	Inlet & Outlet Connections	Recommended Delivery Pressure Range (PSIG)	Width	Height (max.)	Capacity Determined at Set Pressure of PSIG	Capacity**
AA1582MW	NH ₃	Tee Handle	¼" F. NPT	3-25	2 ⅜"	4⅝"	20	2,100 CFH NH ₃
AA1582MK		Hex Head		20-50			30	2,400 CFH NH ₃
AA1582ML				45-125			60	2,600 CFH NH ₃
AA1582MH								
1584MN	LP-Gas	Tee Handle	½" F. NPT	3-30	2 ⅝"	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				3-25			20	4,500 CFH NH ₃
AA1584ML	NH ₃		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	3 ½"	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				3-25			20	7,000 CFH NH ₃
AA1586ML	NH ₃		20-50	30	7,700 CFH NH ₃			
AA1586MH			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. NH₃ for AA1582M Series and 180 CFH/hr. NH₃ 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-liquefaction 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.

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

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.



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				25-50	30	7,500,000
X1586MN			3/4" F. NPT	3-30	20	11,000,000
X1586ML				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-liquefaction 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.

Accessories

Copper Pigtails

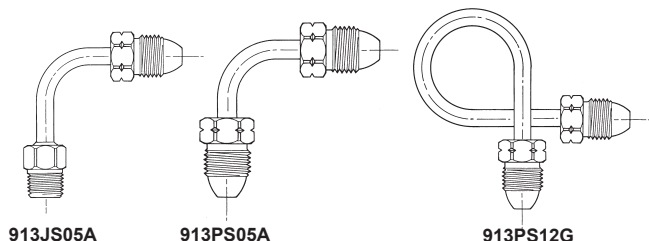
Pigtails are available in a variety of connections, sizes and styles. Care should always be taken in selecting the proper pigtail for a particular application.

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



Bent Pigtails

Connections	Approximate Length	Part Number	Type/Degree of Bend
		3/8" Tube	
1/4" M. NPT x M. POL	5"	913JS05A	90°
M. POL x M. POL	12"	913PS05A	270° Right Hand
		913PS12G	270° Left Hand
		913PS12H	360°
		913PS12S	

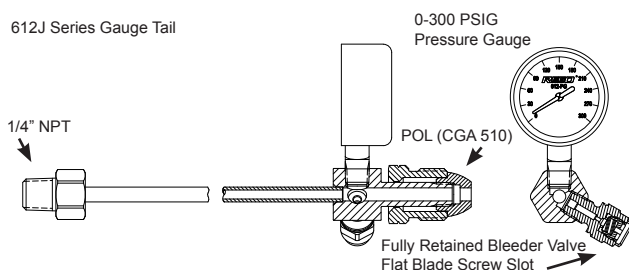


Straight Pigtails

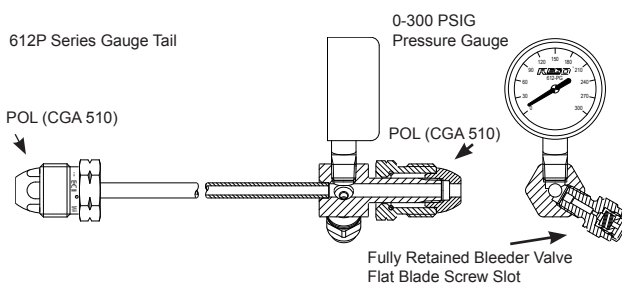
Connections	Approximate Length	Part Number		
		1/4" Tube		3/8" Tube
		7/8" Hex Short Nipple	1 1/8" Hex Long Nipple	7/8" Hex Short Nipple
M.POL x M.POL	5"	-	1/2"	913JS05
	12"	912PS12	-	913PS12
	20"	912PS20	912PA20	913PS20
	30"	912PS30	-	913PS30
	36"	912PS36	912PA36	913PS36
1/4" Inverted Flare x M.POL	12"	912FS12	-	-
	20"	912FS20	912FA20	-
	30"	912FS30	-	-
	36"	912FS36	-	-
1/4" M.NPT x M.POL	5"	-	-	913JS05
	12"	912JS12	-	-
	20"	912JS20	-	-
	36"	912JS36	-	-
1/2" M.NPT x M.Pol	12"	-	-	913LS12
1/2" M.NPT x 3/8" M.Pol	12"	-	-	913KL12

Part Number	Length	7/8" Hex Male - POL Short Nipple	7/8" Hex Male - POL Short Nipple	1/4" Male NPT
612JS12	12"	X		X
612JS20	20"	X		X
612PS12	12"	X	X	
612PS20	20"	X	X	

612J Series Gauge Tail



612P Series Gauge Tail



Accessories

Inlet Fittings

These inlet fittings are available for assembly into either first stage of single stage regulators. All have 1/4" M. NPT connections and are machined from brass.

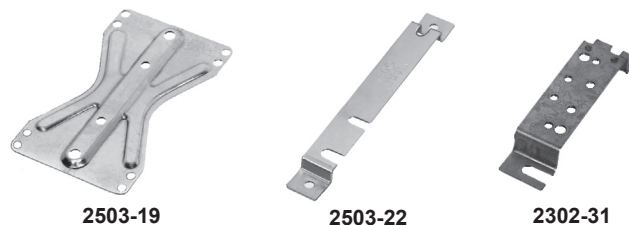
Part Number	Description
970	Hard nose POL with wrench nut.
970AX	Hard nose POL with wrench nut and excess flow.
970AXS	Soft nose POL with wrench nut and excess flow.
3199W	Heavy duty hard nose POL with wrench nut and excess flow.
970AW	Soft nose POL with Handwheel.
970HT	Soft nose POL with Handwheel and 60 DMS orifice.
970S	Soft nose POL with wrench nut and 60 DMS orifice.



Brackets

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

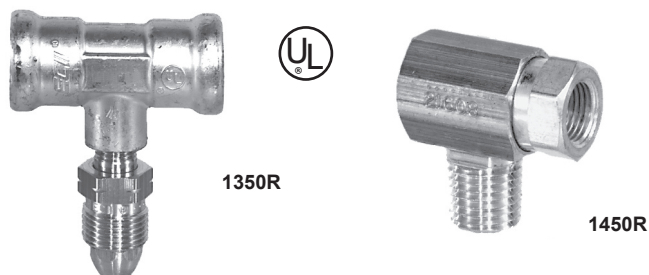
Part Number	Material	For Use With Regulator Model:
2302-31	Cadmium Plated Steel	2302 Series/404B23
2503-22		LV404 Series, 2503 Series LV4403 Series
2503-19	Aluminum	



Tee Check Manifolds

For use in systems that require uninterrupted gas service during cylinder exchange. Especially for summer cottages, mobile homes and single appliance loads. Floating disc check minimizes discharge of gas to the atmosphere when empty cylinder is being replaced.

Part Number	Inlet Connections	Outlet Connection
1350R	F. POL	M. POL
1450R	1/4" Inverted Flare	1/4" M. NPT

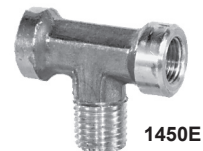
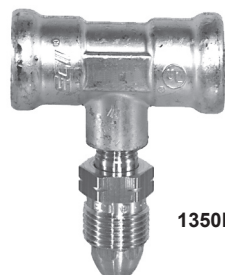


Accessories

Multiple Cylinder Manifolds

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

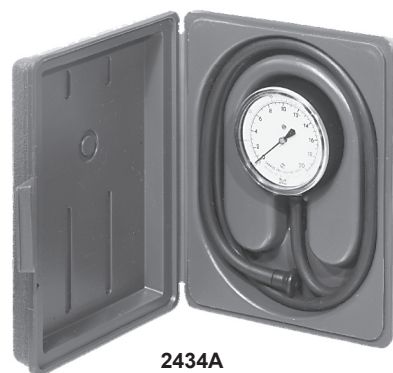
Part Number	Inlet Connections	Outlet Connection
1350E	F. POL	M. POL
1450E	1/4" Inverted Flare	1/4" M. NPT



Low Pressure Test Set

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.

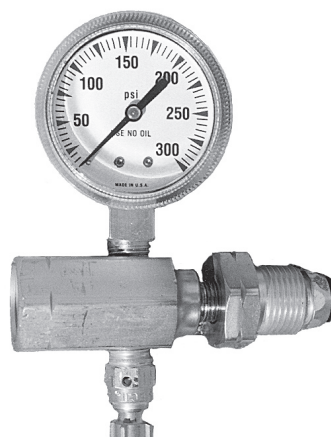
Part Number	Contents	Adapters
2434A	Test Kit	1328
		1331
		1332



High Pressure Gauge Adapter

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.

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



Water Manometer Kit

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.

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.

Part Number	Description
LV4403-400	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.

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

ECI *Engineered Controls
International, Inc.*

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

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Part Number LV4403-400

LP-Gas Cylinder Valves & Service Valves

ECII® 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.

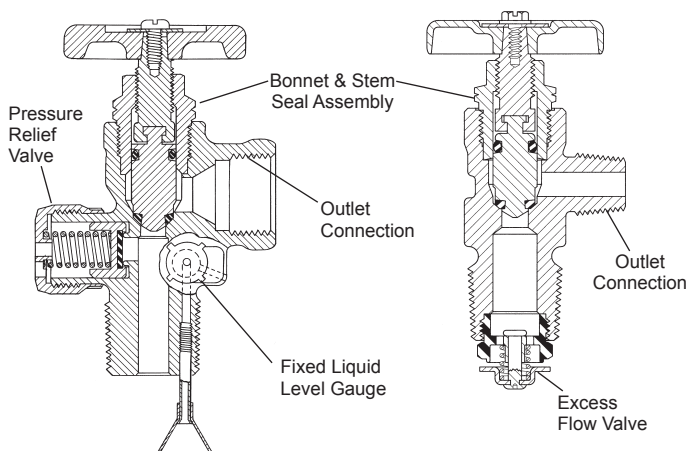
It is recommended that all employees be furnished with a copy of NPGA Safety Pamphlet 306-88 "LP-Gas Regulator and Valve Inspection and Maintenance."

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 is 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 be 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.

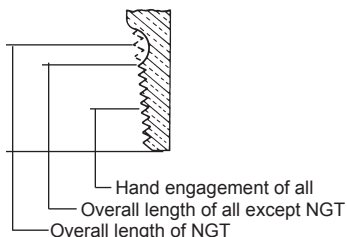
NOTE: There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of legislation which could affect them.

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 $\frac{3}{4}$ " 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 $\frac{3}{4}$ " per foot in NPT connections. In all other respects NPT and NGT threads are similar.

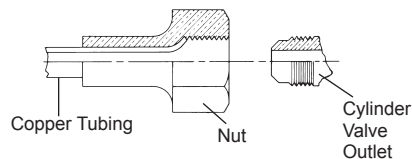
Outlet Connections

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.

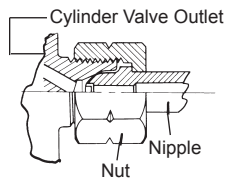
3/8"-18 NPT Thread Connection

This connection also is used for vapor or liquid withdrawal. It has a $\frac{3}{8}$ " diameter thread, and 18 threads per inch, National Pipe Taper Outlet form.



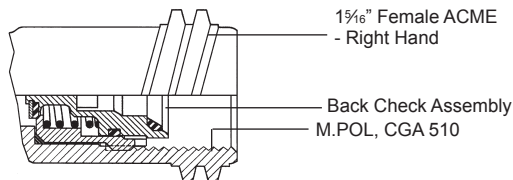
CGA 182, or SAE Flare

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 $\frac{3}{8}$ " SAE (Society of Automotive Engineers) flare. Although this connection is referred to as a $\frac{3}{8}$ ", because $\frac{3}{8}$ " OD tubing is used, the thread actually measures $\frac{5}{8}$ ". 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 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 1 1/8" 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.

Cylinder and Service Valves

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.

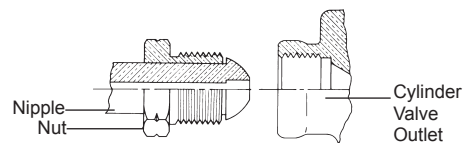
Reliability

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.

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.



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.

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.

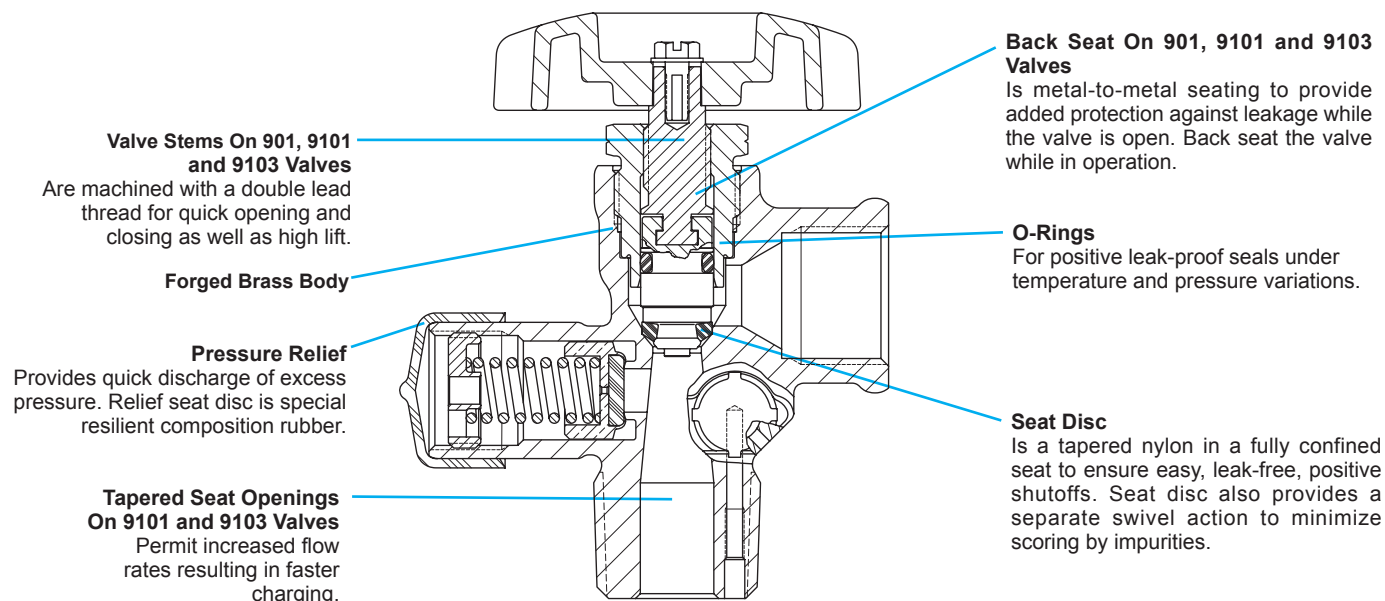
A Valve for Every Need

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.

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® and RegO® Cylinder Valves



Compact Cylinder Valves with Overfilling Prevention Devices

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 1998 edition of NFPA 58.

907NFD Series
Type I Valves



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.	3/4" M. NGT	Type 1	1 15/16" 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

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, with RV's and as a heavy duty barbecue cylinder valve.

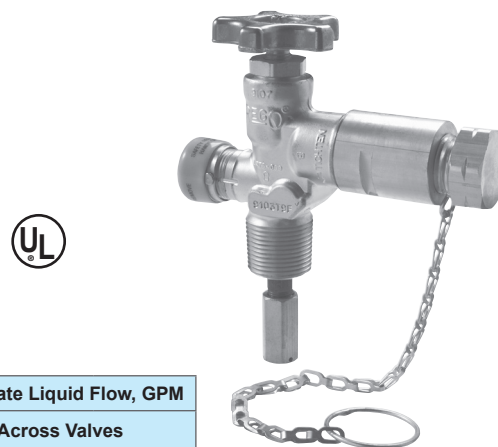
9103D



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 Up To:	Approximate Filling Rate Liquid Flow, GPM				Accessories
							Pressure Drop Across Valves				POL Plug
							10 PSIG	25 PSIG	50 PSIG	100 PSIG	
9103D10.6	3/4" M NGT	F. POL (CGA 510)	Knurled	10.6"	375 PSIG	100 lbs.	12.7	20.3	29.0	41.3	N970P
9103D11.6				11.6"							

Tamper-Resistant Cylinder Valve with Outlet Check for Vapor Withdrawal

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.



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	1/4" 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

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, per NFPA 58.



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	3/4" M. NGT	F. POL (CGA 510)	none	312 PSIG	ASME Tanks*	645

* Surface area up to 23.8 square feet.

Cylinder Valve for Liquid Withdrawal

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.

Part Number	Container Connection	Service Connection	Fixed Liquid Level Vent Valve Style	Dip Tube Length w/ Deflector	Liquid Withdrawl Tube Length
9107K8A	3/4" 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 Valves				Vapor		Liquid
		10 PSIG	25 PSIG	50 PSIG	100 PSIG	25 PSIG Inlet	100 PSIG Inlet	
375 PSIG	100 lbs.	3.3	5.4	7.7	11.1	525 SCFH	1,000 SCFH	1.7 GPM

*Closing flows based on 3/8" O.D. withdrawal tube 44" long or less attached.

IMPORTANT: 1/4" O.D. pigtailed or POL connections for 1/4" O.D. pigtailed 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

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.

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				Liquid Closing Flow* (LP-Gas)
		Pressure Drop Across Valves				
		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.



Service Valves for ASME and DOT Containers or Fuel Line Applications

Designed especially for vapor 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.*



901C1



9101R1



9101D

Part Number	Bonnet Style	Container Connection	Service 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	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

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.



901C5



9101H5



9101H6



Part Number	Container Connection	Service Connection	Liquid Withdrawal Connection	Closing Flow (LP Gas)		
				Vapor		Liquid GPM
				25 PSIG Inlet (SCFH)	100 PSIG Inlet (SCFH)	
901C3	¾" M. NGT	F. POL CGA 510	None	350***	605***	2.6***
901C5				550***	1050***	
9101H5*				765**	1300**	3.6**
9101H6*		¾" SAE Flare	¼" NPT	550****	1050****	2.6****
9101Y5H*		60° Angle ¾" SAE Flare	None	550**	1050**	3.6**



9101Y5H

* Heavy-duty models

** Based on ¾" 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 ¾" 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.

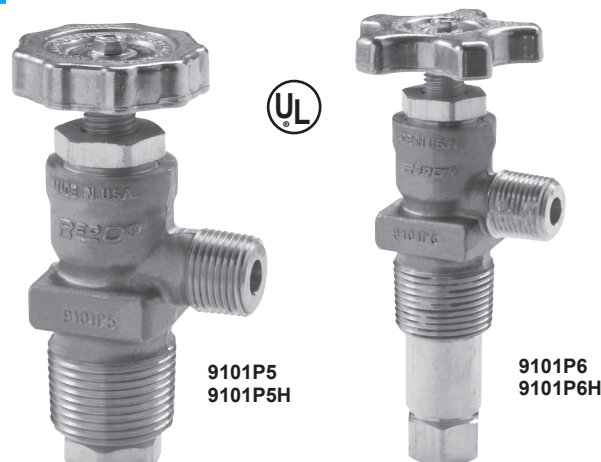
Service Valves for DOT Fork Lift Containers

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 from integral excess flow valves, these service valves should be fully opened and backseated when in use.



Part Number	Container Connection	Service Connection	Liquid Withdrawal Connection	Closing Flow (LP-Gas)			Approximate Filling Rate Liquid Flow, GPM				Accessories		
				Vapor		Liquid (GPM)	Pressure Drop Across Valve				ACME Check Connectors		
				25 PSIG Inlet (SCFH)	100 PSIG Inlet (SCFH)		10 PSIG	25 PSIG	50 PSIG	100 PSIG	Male	Female	Cap
9101P5	¾" M. NGT	⅝" 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.

Adhesive Warning Labels

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

Part Number	
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 temperatures 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 20°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 valves it can damage the seal or guide and cause an uncontrolled leak.

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

ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM:

ECI Engineer ed controls International, Inc.

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

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DANGER!

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 OR 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.

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE
KEEP CYLINDER OUT OF THE REACH OF CHILDREN

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 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.

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

ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM:

ECI Engineered Controls International, Inc.

100 Rego Drive PO Box 247 Elon College, NC 27244 US

Phone (336) 449-7707 Fax (336) 449-6594 www.regocontrols.com

WARNING!

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. 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 to 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.

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Warning No. 903-400

REGO Cylinder & Service Valves

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.

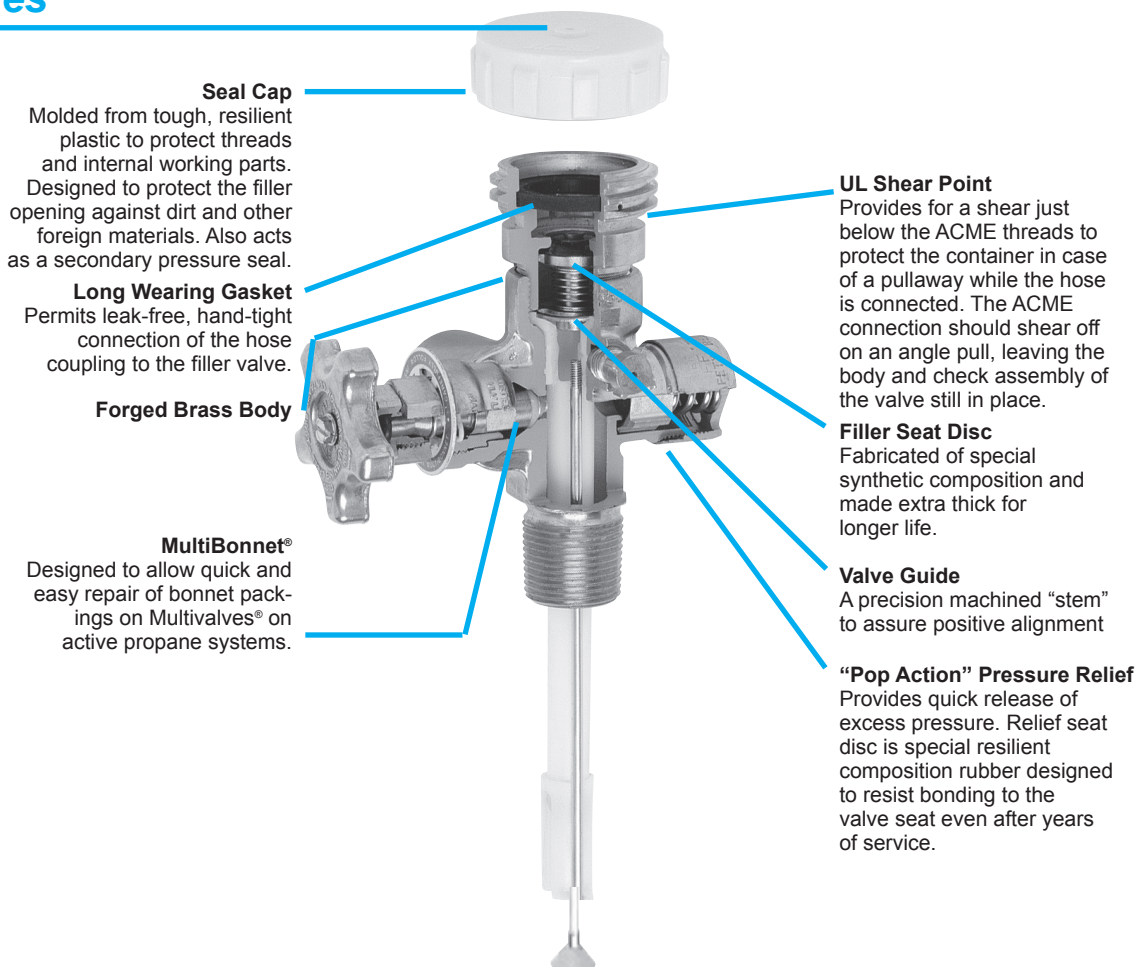
Ease of Maintenance —

- 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.

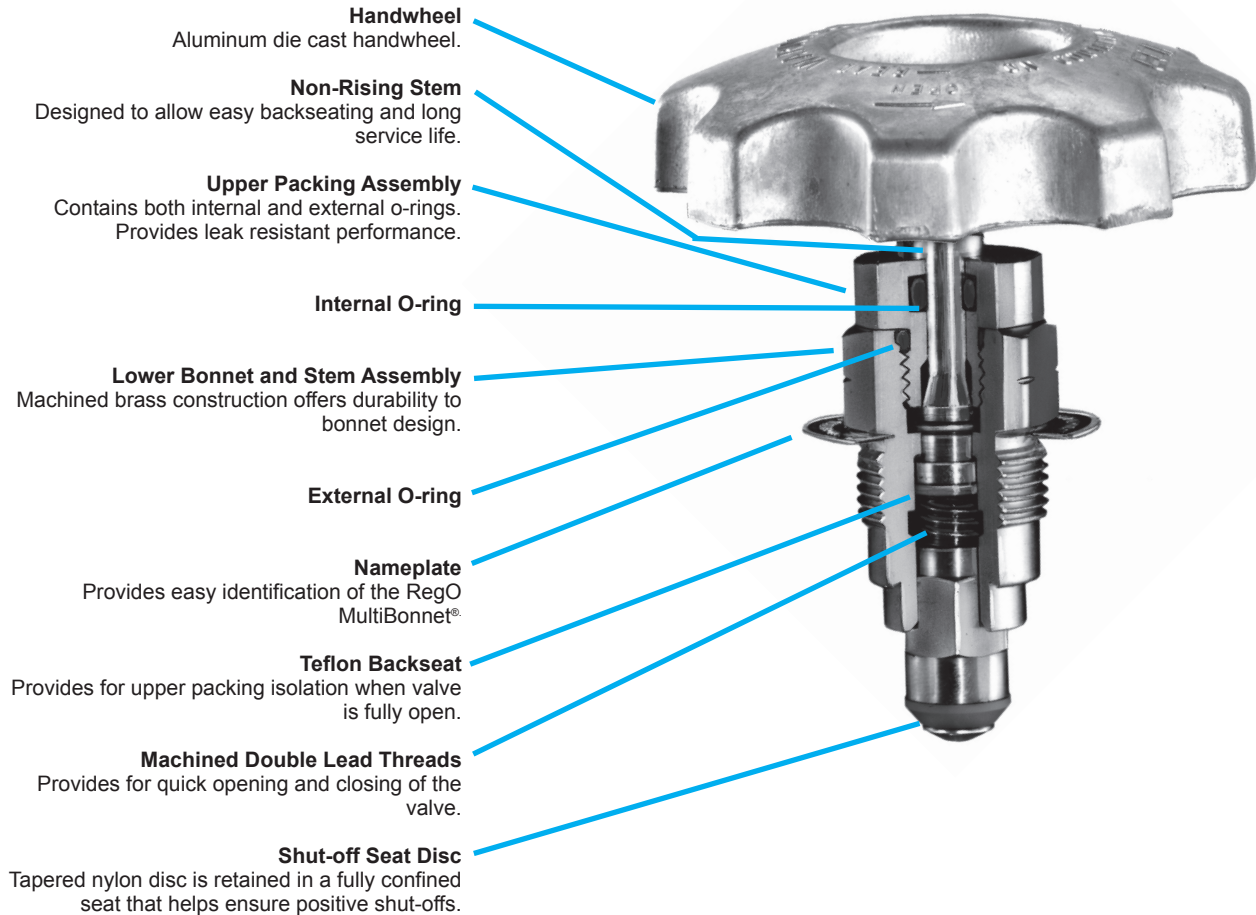
- Wide selection of Multivalves® for domestic, commercial, and industrial needs are available.
- Multivalves® may be ordered with pressure relief, liquid level tube, filler valve, vapor equalizing valve, internal pipe connections, liquid filling and withdrawal connections, and ¼" NPT tapped opening for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

Design Features of RegO Multivalves®



RegO MultiBonnet® Assemblies

Design Features of the MultiBonnet®



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.

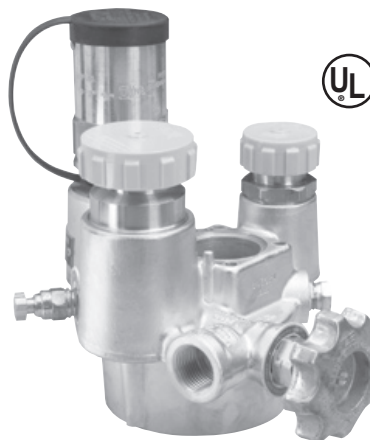
Here's How The MultiBonnet® Works

- 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

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. The MultiBonnet® allows quick and easy repair of bonnet.

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				



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 conatiners w/ surface are up to:
				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	M3131G	2020 SCFM, air	1939 SCFM, air	83 sq. ft. above ground
													276 sq. ft. under ground
G8475RW										MV313269	3995 SCFM, air	n/a	192 sq. ft. above ground
													639 sq. ft under ground

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

ASME Multivalves® for Vapor Withdrawal

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. MultiBonnet® allows quick and easy repair of bonnet.

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



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)	1¼" 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

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.

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



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	3/4" M. NGT	CGA 555*	1 3/4" 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.

DOT Multivalves® for Vapor Withdrawal

These Multivalves® permit vapor withdrawal from DOT cylinders with up to 200 lbs. propane capacity. They allow on-site cylinder filling without interrupting gas service. The MultiBonnet® option allows quick and easy repair of bonnet.

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



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	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®			11.6"														
8555D11.6	Standard																	
8555R11.6	MultiBonnet®																	

* Per CGA Pamphlet S-1.1.

DOT and ASME Multivalves® for Vapor Withdrawal

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. The MultiBonnet® option allows quick and easy repair of bonnet.



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				

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®		1" M. NGT							53 sq. ft.
6542A12.0	Standard									
6542R12.0	MultiBonnet®									
6533A10.5	Standard	DOT	¾" M. NGT				10.5"	375 PSIG	420 lbs. Propane	-
6533R10.5	MultiBonnet®									
6533A11.7	Standard									
6533R11.7	MultiBonnet®									
6543A11.1	Standard		1" M. NGT				11.1"			
6543R11.1	MultiBonnet®									
6543A11.7	Standard									
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

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. MultiBonnet® allows quick and easy repair of bonnet.



Part Number	Container Connection	Service Connection	Vapor Equalization 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.

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.

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.

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.

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.

WARNING

What You Must Do:

- Read This Entire Warning
- Install Properly
- Inspect Regularly

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.

Pipeaways and defectors 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 defectors, 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.

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 over pressurized container – raises serious safety concerns!

Suggested Replacement for Pressure Relief Valves Is 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. ECI® Catalog L-500.
3. ECI® 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.

Rego® Pressure Relief Valves

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 defectors are available on larger relief valves. These defectors 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 container, 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 defectors 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 NH₃. Hydrostatic relief valves carrying an “SS” prefix are of stainless steel construction and are suitable for use with NH₃. 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 NH₃ service only.

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, 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 2000 square feet, the required flow rate can be calculated using the formula, Flow Rate—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 3.1416.
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—CFM Air = $22.11 A^{0.82}$ where A = outside surface area of the container in square feet.

Conversion Factor

$$\begin{aligned} \text{ft}^2 \times 0.092 \ 903 &= \text{m}^2 \\ \text{CFM} \times 0.028 \ 317 &= \text{m}^3/\text{min} \\ \text{ft} \times 0.304 \ 8 &= \text{m} \end{aligned}$$

“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

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

Part Number	Start To Discharge Setting PSIG	Container Connection	Overall Height (Approx.)	Height Above Coupling (Approx.)	UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)	Suitable for Tanks with Surface Area Up To:*	Protective Cap (Included)
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.

Stainless Steel



Fully Internal “Pop-Action” Pressure Relief Valves for Motor Fuel Containers

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.



7543-10



7544-11A

Part Number	Container Type	Start To Discharge Setting PSIG	Container Connection M. NPT	Overall Height (Approx.)	Height Above Coupling (Approx.)	Hex Wrenching Section	Flow Capacity SCFM/Air****		Protective Cap (Included)	Accessories Pipeaway Adapter
							UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)		
8544G	ASME	250	1”	5 7/16”	7/8”	1 5/16”	1020	936	7544-41	7544-11A*
8543G			1 1/4”			1 11/16”	1465	1400	7543-40C	7543-10**
8544T		312	1”			1 5/16”	1282	1158	7544-41	7544-11A
8543T			1 1/4”			1 11/16”	1990	1731	7543-40C	7543-10**
8544K	DOT/ASME	375	1”			1 5/16”	1545***	-	7544-41	7544-11A

* 1” M. NPT outlet connection.

** 1 1/4” M. NPT outlet connection.

*** Rating also applies to DOT requirements.

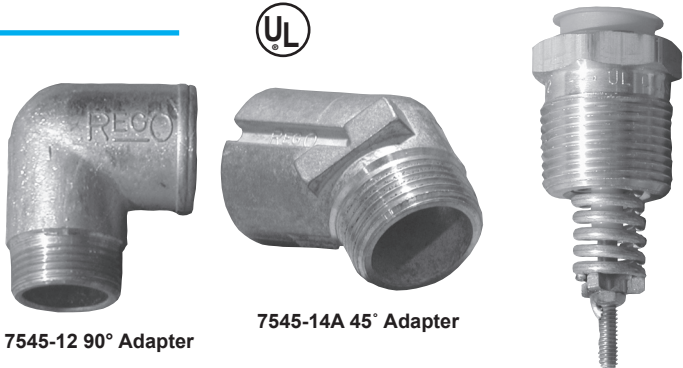
**** Flow rates shown are for bare relief valves. Adapters and pipeaway will reduce flow as discussed in forewording information.

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

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.”



Part Number	Container Type	Start To Discharge Setting PSIG	Container Connection M. NPT	Flow Capacity SCFM/Air**	Accessories (Order Separately)		
				(ECII® Rated at 480 PSIG)	Protective Cap	Deflectors***	
						45° Elbow	90° Elbow
8545AK	Dot	375	¾"	400*	7545-40	7545-14A	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 262 pounds or less weight of water or 109 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

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.



Part Number	Start To Discharge Setting PSIG	Container Connection M. NPT	Overall Height (Approx.)	Height Above Coupling (Approx.)	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	¾"	8⅜"	1⅞"	1¾"	1980	1806	80 Sq. Ft.	7583-40X
8684G		1"	9⅞"	1⅞"	1⅞"	2620	2565	113 Sq. Ft.	8684-40
8685G		1¼"	11⅞"	1⅞"	2⅜"	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

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.

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

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.



Part Number	Start To Discharge Setting PSIG	Container Connection M. NPT	Overall Height (Approx.)	Wrench Hex Section	Flow Capacity SCFM/Air (a)		Suitable for Tanks w/Surface Area Up To: (e)	Accessories			
					UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)		Protective Cap	Part Number	Outlet Size	Weep Hole Deflector
AA3126L030	30	½"	2⅝"	⅞"	(b)	-	-	7545-40	AA3126-10	½" M. NPT	-
A3149L050	50	2½"	10½"	4⅞"	2600(c)	-	113 Sq. Ft.	3149-40	(h)		Included (j)
A3149L200	200				8770 (c)	-	500 Sq. Ft.				
AA3126L250	250	½"	2⅜"	⅞"	277 (c)	-	23 Sq. Ft. (f)	7545-40	AA3126-10	½" M. NPT	-
3131G		¾"	3 ⅞"	1¾"	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 ⅜"	2⅝"	3340	-	154 Sq. Ft.	3132-54 (g)	3132-10	1¼" F. NPT	3133-11
3132G					4130	-	200 Sq. Ft.		-		
T3132G		1¼"	6 ⅜"	2⅝"	3790	-	180 Sq. Ft.		3132-10	1¼" F. NPT	
MV3132G					3995	-	190 Sq. Ft.		-		
3135G					5 2½/32"	-	300 Sq. Ft.	3135-54 (g)	3135-10	2" F. NPT	
AA3135UA250					6 ⅜/32"	-	1010 Sq. Ft. (f)	AA3135-40PR	AA3135-10		
3133G					1½"	5 ⅜"	3⅝"	6080	-	320 Sq. Ft.	3133-40 (g)
A3149G		2½"	10½"	4⅞"	10390	9153	613 Sq. Ft.	3149-40			
AA3130UA265	265	¾"	3 ⅞"	1¾"	2125	1912	261 Sq. Ft. (f)	AA3130-40P	AA3131-10	1" F. NPT	-
AA3135UA265		1¼"	6 ⅜/32"	2 ⅞/16"	6615	5370 (d)	1045 Sq. Ft. (f)	AA3135-40PR	AA3135-10	2" F. NPT	3133-11
AA3126L312	312	½"	2⅜"	⅞"	330 (c)	-	27 Sq. Ft. (f)	7545-40	AA3126-10	½" 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 3/4-8N (F) thread, will accept 3" M. NPT pipe thread.

(j) Weep hole deflector is Part No. AA3134-11B.

External “Pop-Action” Supplementary Pressure Relief Valves for Small ASME Containers and DOT Cylinders

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.



Part Number	Container Type	Start To Discharge Setting PSIG	Container Connection M. NPT	Overall Height (Approx.)	Wrench Hex Section	Flow Capacity SCFM/Air		Suitable for Tanks w/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	¼"	1 31⁄32"	7⁄8"	295	-	-	7545-40	-	
3129G			½"	2 19⁄32"	1 1⁄8"	465		3129-10		½" F. NPT	
3127K	DOT	375	¼"	1 31⁄32"	7⁄8"	-	450	100 lbs./Propane		-	
3129K			½"	2 19⁄32"	1 1⁄8"		780	200 lbs./Propane		3129-10	½" 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

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.

Part Number	Start To Discharge Setting PSIG	Valve Body Material	Container Connection M. NPT	Height (Approx.)	Wrench Hex Section	Accessories	
						Protective Cap	Pipeaway
							Adapter or Threads
SS8001G	250	Stainless Steel	1/4"	7/8"	1 1/16"	-	-
SS8002G			1/2"		7/8"		
SS8021G			1/4"	1 1/16"	1/4" NPSM Thrds		
SS8022G			1/2"	7/8"	3/8" NPT Thrds		
3127G			1/4"	1 31/32"	-		
3129G	275	Brass	1/2"	2 19/32"	1 1/8"	7545-40	3129-10*
3127H			1/4"	1 31/32"	7/8"		-
3129H			1/2"	2 19/32"	1 1/8"		3129-10*
3127P			1/4"	1 31/32"	1 1/8"		-
3129P	300	Brass	1/2"	2 19/32"	1 1/8"		3129-10*
3127J			1/4"	1 31/32"	7/8"	-	
3129J			1/2"	2 19/32"	1 1/8"	3129-10*	
SS8001J	350	Stainless Steel	1/4"	7/8"	1 1/16"	-	-
SS8002J			1/2"		7/8"		
SS8021J			1/4"	1 1/16"	1/4" NPSM Thrds		
SS8022J			1/2"	7/8"	3/8" NPT Thrds		
3127K	375	Brass	1/4"	1 31/32"	7/8"	7545-40	-
3129K			1/2"	2 19/32"	1 1/8"		3129-10*
3125L	400	Brass	1/4"	1 9/16"	5/8"	Included	-
3127L			1 31/32"	7/8"	7545-40	-	
3129L			1/2"	2 19/32"	1 1/8"	3129-40P	3129-10*
SS8001L		Stainless Steel	1/4"	7/8"	1 1/16"	-	-
SS8002L	1/2"		7/8"				
SS8021L	1/4"		1 1/16"	1/4" NPSM Thrds			
SS8022L	1/2"		7/8"	3/8" NPT Thrds			
3127U	450	Brass	1/4"	1 31/32"	7/8"	7545-40	-
3129U			1/2"	2 19/32"	1 1/8"		3129-10*
SS8001U		Stainless Steel	1/4"	7/8"	1 1/16"		-
SS8002U	1/2"		7/8"				
SS8021U	1/4"		1 "	1 1/16"	1/4" NPSM Thrds		
SS8022U	1/2"	7/8"	3/8" NPT Thrds				

* 1/2" F. NPT outlet connection.



3127G

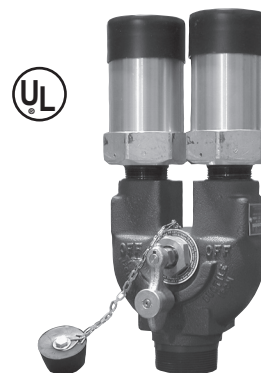


SS8022G

DuoPort® Pressure Relief Valve Manifolds for Small Storage Containers

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.

Different settings available



Part Number	Start to Discharge Setting PSIG	Application		Container Connection M. NPT	Relief Valve Included				Flow Capacity SCFM/ Air** (at 120% of set pressure)	
					Quantity	Part Number	Inlet Connection M. NPT	Accessory	UL Rating	ASME Rating
		LP-Gas	NH3					Pipeaway Adaptors		
8542G	250	Yes	No	2"	2	3435MG	1 1/4"	3135-10*	5250 (1)	NA
AA8542UA250		No	Yes			AA3135MUA250		AA3135-10*	5865 (1)	6514 (1)
AA8542UA265	265					AA3135MUA265			5975 (1)	6886 (1)

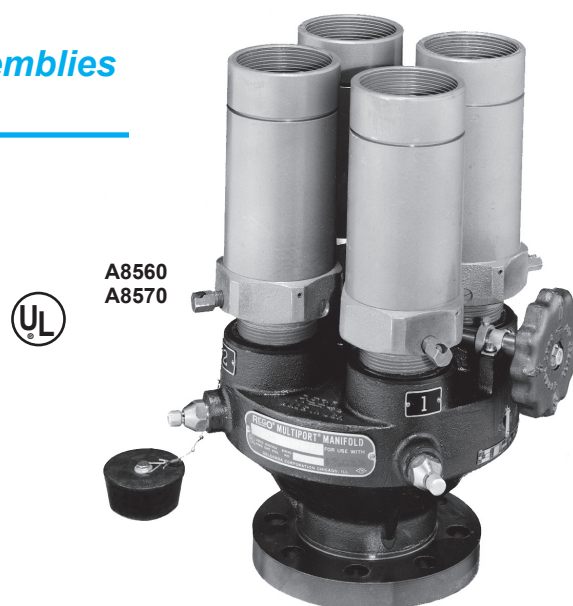
* 2" F. NPT outlet connection.

** Flow rating based on number of relief valves indicated in parenthesis (). Flow rates shown are for bare relief valves. Adapters and pipeways will reduce flow rates as discussed in forewording information.

Multiport™ Pressure Relief Valve Manifold Assemblies for Large Storage Containers

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.

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			Manhold Cover Plate	



Part Number	Start To Discharge Setting PSIG	Application		Container Flange Connection	Relief Valve				Flow Capacity SCFM/Air** At 120% of Set Pressure	
		LP-Gas	NH ₃		Quantity	Part Number	Inlet Connection M. NPT	Accessories	UL Rating	ASME Rating
								Pipeaway Adapters		
A8563G	250	Yes	Yes	3"-300#*	3	A3149MG	2½"	****	18,500 (2)	Not Applicable
A8564G					4				27,750 (3)	
AA8573G		No		4"-300#	3	AA3135MUA250	1¼"	AA3135-10***	11,400 (2)	
AA8573G									Yes	
A8573G										
A8574G	250	Yes	Yes	3"-300#*	3	A3149G	2½"	****	Not Applicable	18,300 (2)
A8563AG					4					27,400 (3)
A8564AG				4"-300#	3					18,300 (2)
A8573AG					4					27,400 (3)
A8574AG										

* For use with modified 300# ANSI flange with 4" port.

*** 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 pipeways will reduce flow rates as discussed in forewording information.

**** Outlet 3/8-8N (F) thread, will accept 3" M. NPT pipe thread.

REGO Pressure Relief Valves & Relief Valve Manifolds

"V"-Ring Seal Globe and Angle Valves

General Information

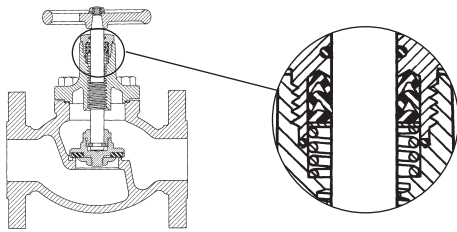
RegO® Globe and Angle Valves are designed and manufactured especially to meet the rigid requirements of the LP-Gas industry. The high quality construction and wide variety of sizes and styles also make them highly suited to many other industries such as anhydrous ammonia, chemical and petrochemical.

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.

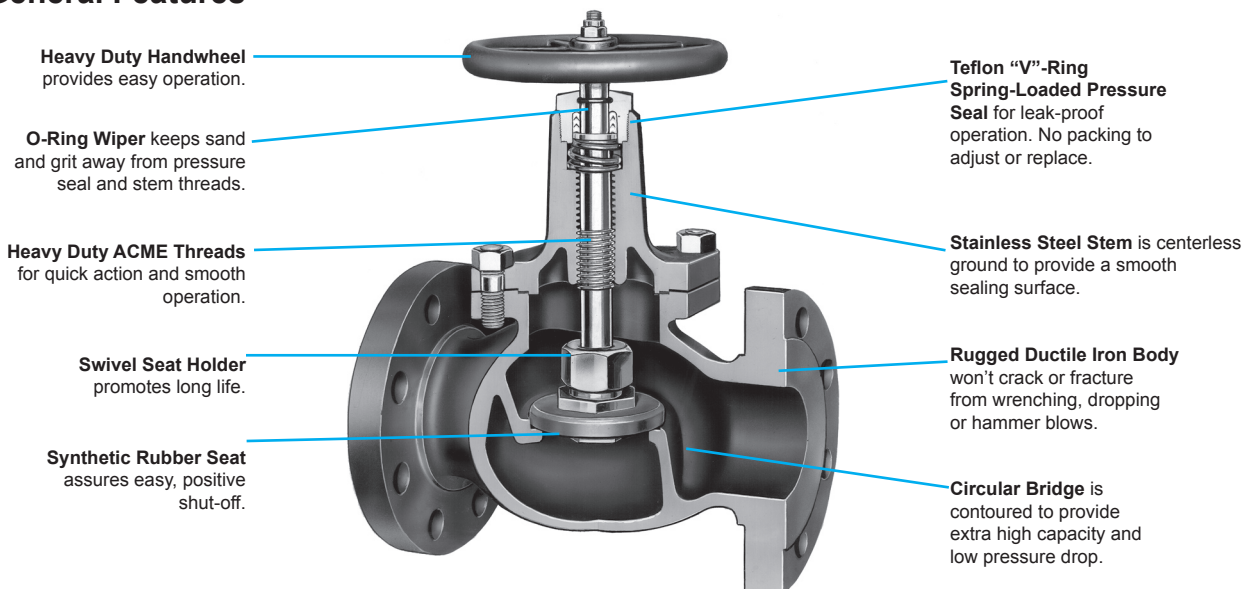
Hydrostatic Relief—When the design of the piping installation is such that liquid may be locked between two shut-off valves, a hydrostatic relief valve should be installed in the lines between the valves. The pressures which can develop due to temperature increase in a liquid-full line are tremendous 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



“V”-Ring Seal Globe and Angle Valves for Bulk Storage Containers, Transports, Bobtails and Plant Piping

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.

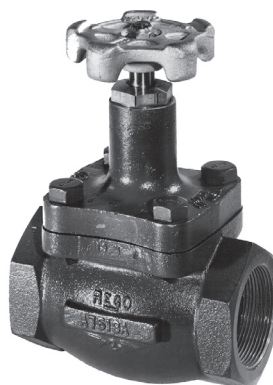
The high quality construction and wide variety of sizes make them highly suited for use with LP-Gas, anhydrous ammonia and in the chemical and petrochemical industries.



TA7034



A7505AP



A7513AP



A7517FP



A7514AP



A7517AP



A7518FP

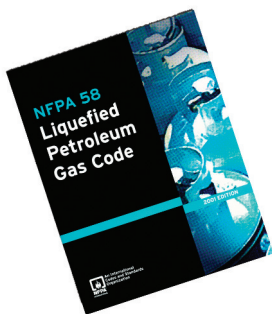
Part Number				Inlet and Outlet Connection	Port Diameter	Flow at 1 PSIG Pressure Drop (Cv) (GPM/ Propane)***		Accessories	
Buna N Seat Discs		Teflon Seat Discs*				Globe	Angle	Hydrostatic Relief Valve	Vent Valve
Globe	Angle	Globe	Angle						
-	-	TA7034P	TA7034LP	½" F. NPT	¾"	10.0	14.8	SS8001U	TSS3169
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	TA7614FP	2" Flange**		78.0	133.0		
A7517AP	A7518AP	TA7517AP	TA7518AP	3" F. NPT	3½"	197.0	303.0		
A7517AP	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 = $133 \times \sqrt{9} = 399$ GPM/propane. For NH₃ flow, multiple propane flow by .90.

ECII® 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 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.

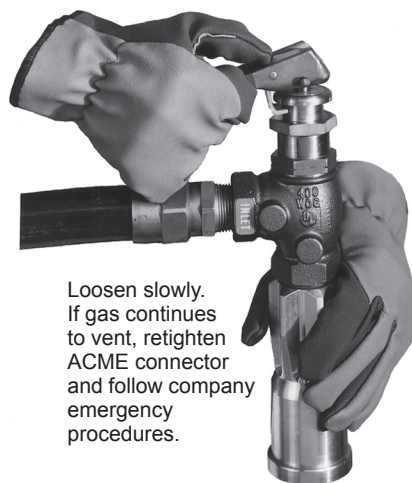
If gas does not stop venting, then filler valve or hose-end valve is leaking. Do not disconnect filling connector. This is a hazardous situation and your company procedure for handling this problem must be carefully followed. Make sure your company has such a procedure.

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



Loosen slowly.
If gas continues
to vent, retighten
ACME connector
and follow company
emergency
procedures.

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.

Larger Filler and Filling Valves

For 2½" 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

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.



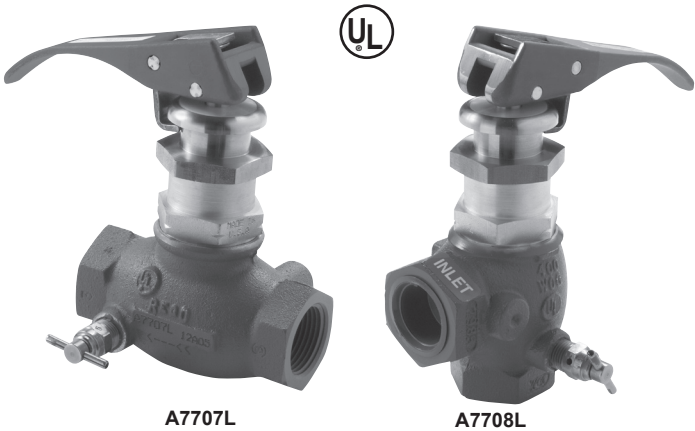
Part Number	Inlet Connection (F. NPT)	Outlet Connection (F. ACME)	Locking Handle	Flow at 1 PSIG (Cv) Pressure Drop* (GPM/Propane)
A7793A	3/4"	1 3/4"	Yes	16.0
A7797A	1"	1 3/4"	Yes	16.0

* 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 √9 = 48.0 GPM/propane. For NH₃ flow, multiply propane flow by .90.

Quick-Acting Hose-End Valves for Bobtail Delivery Trucks and Dispensing Stations

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.



A7707L

A7708L

Part Number	Body Design	Inlet & Outlet Connection (F. NPT)	Locking Handle	Flow at 1 PSIG Pressure Drop (Cv) (GPM/Propane)**	Accessories		
					Filling Connectors**		
					Extended	Compact	
					Steel	Brass	Steel
A7707L	Globe	1"	Yes	18.0	A7575L4	3175A	A3175A
A7708L	Angle			22.0			

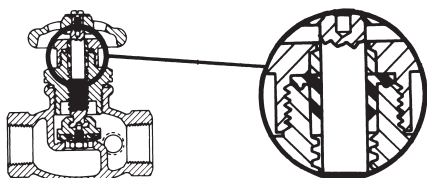
* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: A7708L @ 9 PSIG = 22.0 x √9 = 66.0 GPM/propane. For NH₃ flow, multiply propane flow by .90.

** See appropriate catalog section for additional information.

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 1/4" 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

Rugged quick-acting ACME threads on stem. Threads are under flange ring . . . dust, sand and grit can't reach them.

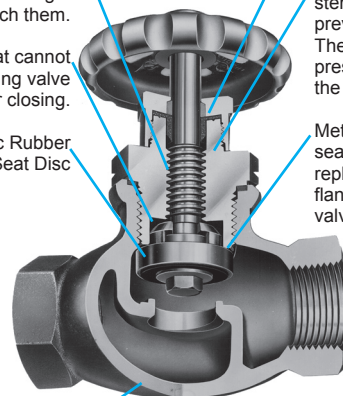
Swivel seat cannot grind during valve opening or closing.

Synthetic Rubber Seat Disc

Nylon bearing surrounds stem to prevent galling.

Rubber flange ring stem seal effectively prevents gas escape. The higher the pressure, the tighter the seal.

Metal to metal back seat permits replacement of flange ring with valve in service.



Valve body made of shell molded ductile iron. Highly resistant to cracking or fracturing from wrenching, dropping or hammer blows. Bonnet and seal cap are steel on "A" prefix valves.

Flange Seal Globe and Angle Valves for Bulk Storage Containers, Filling Hoses and Plant Piping

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.

Part Number		Inlet & Outlet Connection (F. NPT)	Flow at 1 PSIG Pressure Drop (Cv) (GPM/Propane)*		Accessories	
			Globe	Angle	Hydrostatic Relief Valve	Vent Valve
7704P	7704LP	1/2"	7.3	12.3	SS8001J or SS8001L	TSS3169
A7704P	A7704LP					
7705P	7706P	3/4"	11.5	17.7	SS8001J or SS8001L	TSS3169
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 NH₃ flow, multiply propane flow by .90.



A7704P



A7706P

Flange Seal Liquid Transfer Angle Valves for Bulk Storage Containers

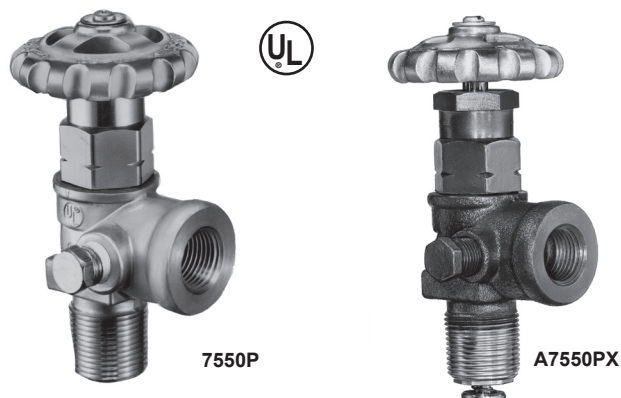
Designed especially for liquid transfer of LP-Gas from consumer bulk storage containers when used with a Chek-Lok® or equipped with an integral excess flow valve. May also be used for vapor LP-Gas service.

In NH₃ 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 1 1/4" x 3/4" NPT reducing coupling, the 3/4" 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.



Part Number	Inlet Connection (M. NPT)	Outlet Connection (F. NPT)	Integral Excess Flow	Flow at 1 PSIG (CV) Pressure Drop* (GPM/Propane)	Excess Flow Approximate Closing Flow** (GPM/Propane)	Accessories	
						Hydrostatic Relief Valve	Vent Valve
7550P	3/4"	3/4"	No	13.3	-	3127U	3165
A7550P						SS8001J	TSS3169
7550PX			Yes	-	16.0	3127U	3165
A7550PX						SS8001J	TSS3169
7551P		1/2"	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 √9 = 39.9 GPM/propane. For NH₃ flow, multiply propane flow by .90.

** For NH₃ flow, multiply propane flow by .90.

Quick-Acting Valves for Cylinder Charging Hoses

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.

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		1/4"		
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 √9 = 5.85 GPM/propane. For NH₃ flow, multiply propane flow by .90.

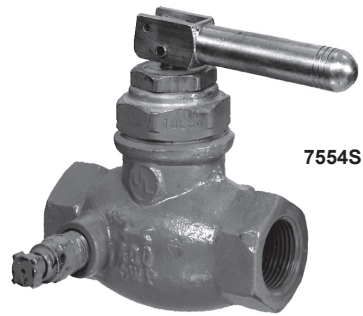


Quick-Acting Valves for Crop Driers and Charging Manifold Hoses

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.



7554S



7554LV



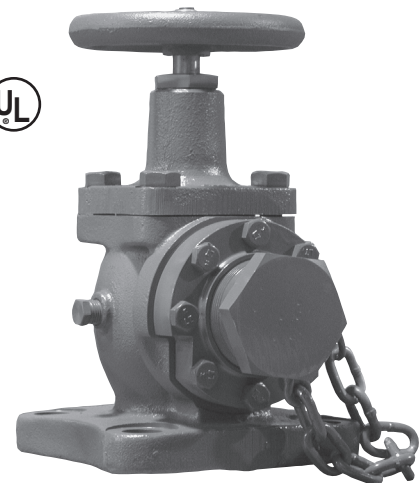
Part Number	Inlet & Outlet Connection (F. NPT)	Locking Handle	Flow At 1 PSIG (Cv) Pressure Drop* (GPM/Propane)
7554SAV	½"	No	7.3
7554LAV		Yes	
7554SV	¾"	No	11.3
7554LV		Yes	

* 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 = $11.3 \times \sqrt{9} = 34.5$ GPM/propane.

Tank Car Angle Valves for Railroad Tank Cars

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.



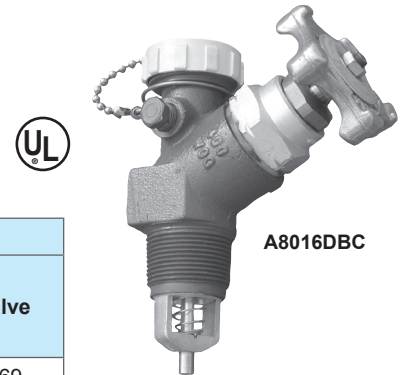
Part Number	Inlet Connection	Outlet Connection	Flow at 1 PSIG (CV) Pressure Drop (GPM/ Propane)	Accessories	
				Hydrostatic Relief Valve	Vent Valve
TA7894P	Tank Car Flange	2"	112	SS8001U	TSS3169

* 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 = $112 \times \sqrt{9} = 336$ GPM/propane. For NH₃ flow, multiply propane flow by .90.

Multipurpose Valve for Filling of NH₃ Containers

Designed specifically for use as a manual filler valve on anhydrous ammonia applicator and nurse tanks. This valve incorporates an integral back check valve.

Part Number	Inlet Connection	Filling Connection	Filling Capacity at 20 PSIG Pressure Drop GPM/NH ₃	Accessories	
				Hydrostatic Relief Valve	Vent Valve
A8016DBC	1 1/4"	1 3/4"	95	SS8001J	TSS3169



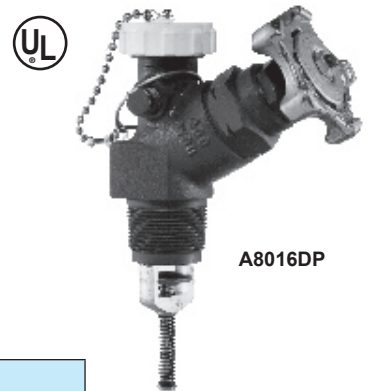
A8016DBC

Multipurpose Valve for NH₃ Containers

Designed specifically for use on anhydrous ammonia applicator and 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.

Part Number	Inlet Connection (M. NPT)	Filling Connection (M. ACME)	Filling Capacity At 20 PSIG Pressure Drop GPM/NH ₃	Approximate Excess Flow Closing Flows		Accessories	
				Liquid* GPM/NH ₃	Vapor** CFH/NH ₃	Hydrostatic Relief Valve	Vent Valve
A8016DP	1 1/4"	1 1/4"	95	44	24,000	SS8001J	TSS3169



A8016DP

* Determined at 9.5 to 12 PSIG differential.

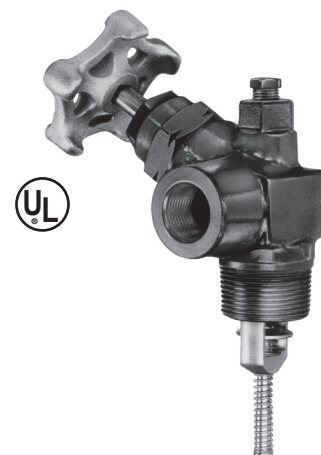
** Determined at 100 PSIG inlet.

Multipurpose Valves for Liquid Withdrawal of LP-Gas and NH₃ Containers

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.



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		

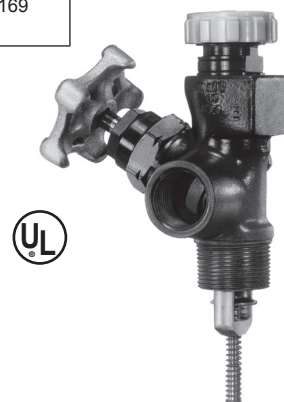
* Built-in back pressure check valve incorporated into shut-off valve.

** Determined at 11.5 to 13.5 PSIG differential for 3/4" outlet and 9 to 12 PSIG differential for 1" outlet. For NH₃ flow, multiply by .90.

Multipurpose Valve for Filling and Liquid Transfer of NH₃ Containers

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.



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	1 1/4"	1"	1 3/4"	74	50	SS8001J	TSS3169

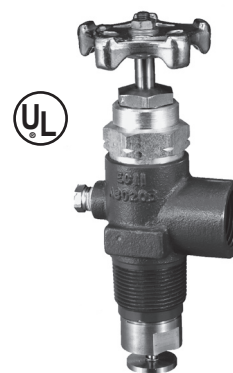
* Determined at 9 to 12 PSIG differential.

Multipurpose Right Angle Valve for Liquid or Vapor Service In LP-Gas and NH₃ Systems

Designed especially for use as a high capacity liquid withdrawal valve in LP-Gas and NH₃ systems.

Valve may be mounted directly in nurse tank load-out risers eliminating the need for a separate excess flow valve and angle valve.

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.

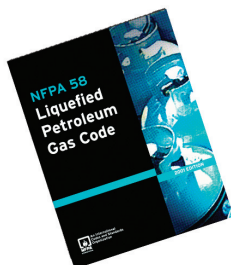


Part Number	Inlet Connection (M. NPT)	Outlet Connection (F. NPT)	Approximate Excess Flow Liquid Closing Flow*		Accessories	
			GPM/Propane	GPM/NH ₃	Hydrostatic Relief Valve	Vent Valve
A8020D	1 1/4"	1"	78	70	SS8001J	TSS3169

* Determined at 13 PSIG differential.

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

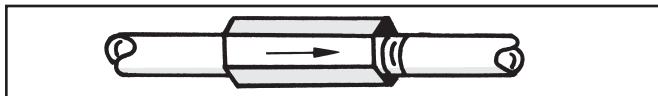
It is recognized that warnings should be as brief as possible, but the factors involved in excess flow valve failures to perform are not simple. They need to be fully understood. If there is a simple warning, it would be:

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.

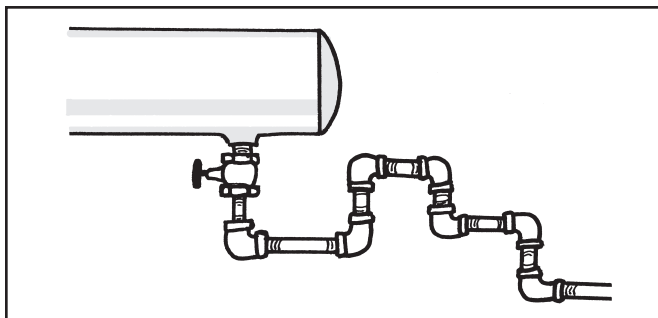
Engineered Controls International, Inc. provides excess flow valves with a number of closing ratings. Engineered Controls International, Inc. obviously can take no responsibility for the proper selection or correct installation of any valve.

Excess flow valves do not provide complete shut-off because there is a bleed at the check to permit pressure equalization.

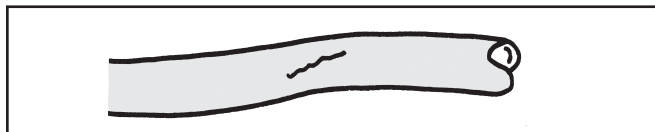
Causes of Failure to Close

Installers, LP-Gas plant managers and service personnel should be aware that the excess flow valves may not close if these conditions are present.

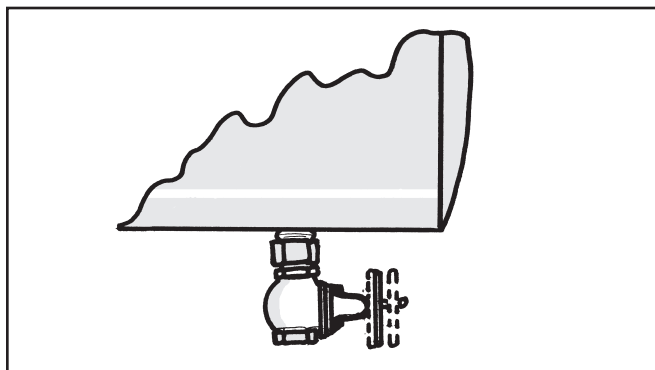
1. The piping system restrictions (due to pipe length, branches, reduction in pipe size or number of other valves) decrease the flow rate to less than the valve's closing flow.



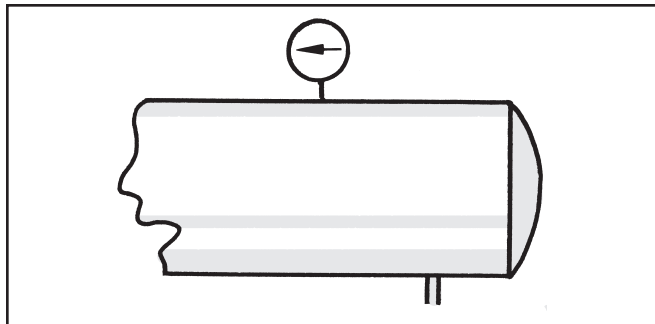
2. The break or damage to the downstream line is not large enough to allow enough flow to close the valve.



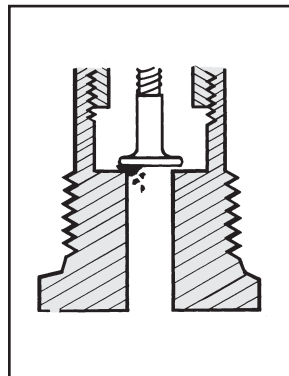
3. A shut-off valve in the line is only partially open and will not allow enough flow to close the excess flow valve.



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.

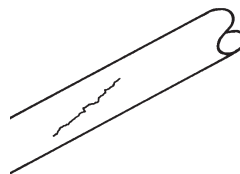
A test involving venting gas to the atmosphere is hazardous and may be impractical or illegal.

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?

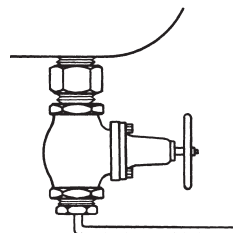
For one or a combination of the following reasons, excess flow valves have been prevented from closing in emergencies:

1. Not a Clean Break



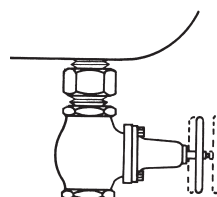
Hoses with a split or tear, and pipe lines not completely severed may be emitting LP-Gas in an amount insufficient to cause an "excess" flow. The amount of LP-Gas which can escape through such breaks may be even less than the flow during normal transfer service and under these conditions the excess flow valve could not be expected to close.

2. Line Restriction Too Great



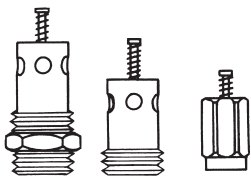
An excess flow valve installed in a tank outlet will not close if the line beyond it is reduced or if the flow is otherwise restricted by too many fittings or too long a run because the line is incapable of passing the amount of LP-Gas necessary to create an "excess" flow. This condition should be corrected 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



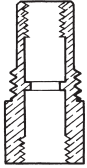
A restriction can also be imposed upon the excess flow valve by an improperly opened valve at the tank outlet. The shut-off valve should be either fully opened or fully closed. If "throttled," the valve could reduce the amount of LP-Gas passing through the excess flow valve in a sufficient amount to keep it from closing. Throttling operations should not be performed in the lines being protected by excess flow valves.

4. Improper Selection



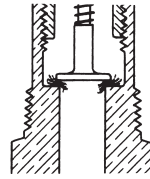
The many types of excess flow valves available are designed for specific jobs. The excess flow valve selected should remain open during normal flow but close at "excess" flow. An inspection which simulates a line break prior to start-up operations will determine if the proper valve has been selected.

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 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.

Cotter pin prevents loss of spring retainer due to vibration in service.

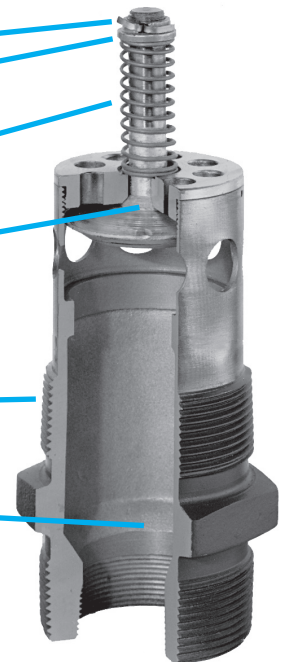
Spring retainer.

Stainless steel spring for consistent closing flow, long service life.

Welded for strength.

Precision machining.

Generous flow channels for lowest pressure drop are particularly important in pump suction lines.



The Limitations of Excess Check Valves for LP-Gas

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

The purpose of this bulletin is to set forth general safety practices for the installation, operation, and maintenance of LP-Gas equipment. It is not intended to be an exhaustive treatment of the subject, and should not be interpreted as precluding other procedures which would enhance safe LP-Gas operations. The National Propane Gas Association assumes no liability for reliance on the contents of this bulletin.

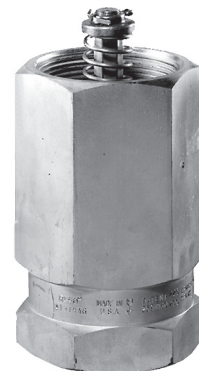
Excess Flow Valves for Liquid or Vapor Service

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.



1519C2



1519C4

Part Number	Inlet Connection NPT	Filling Connection F. NPT	Wrench Hex Flats	Approximate Closing Flows		
				Liquid (GPM Propane)	Vapor SCFH (Propane)	
					25 PSIG Inlet	100 PSIG Inlet
1519C2	1½" Male*	1"	2¼"	25	5,000	8,800
1519C4	2" Female	2"	3"	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.

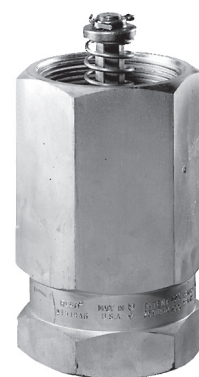
NOTE: Multiply flow rate by .94 to determine liquid butane flow.

Excess Flow Valves for Liquid or Vapor Line Service

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.



1519A2



A1519A6

Part Number	Brass or Steel	Inlet Connection NPT	Outlet Connection F. NPT	Wrench Hex Flats	Approximate Closing Flows*		
					Liquid (GPM Propane)	Vapor SCFH (Propane)	
						25 PSIG Inlet	100 PSIG Inlet
1519A2	Brass	1"	1"	1¼"	25	5,000	8,800
A1519A2	Steel						
1519A3	Brass	1½"	1½"	2¼"	60	11,500	20,200
1519A4		2"	2"	3"	100	19,000	34,500
A1519A4	Steel				133	27,700	50,300
1519B4	Brass						
A1519B4	Steel	3"	3"	4"	225	45,000	82,000
A1519A6							

* 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 Valves for Liquid or Vapor

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.



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 Flow*		
						Liquid (GPM Propane)	Vapor SCFH (Propane)	
							25 PSIG Inlet	100 PSIG Inlet
12472	Brass	¾"	¾"	1⅜"	1⅜"	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	1¼"	1¼"	2"	1 ¹⁵ / ₁₆ "	30	5,850	10,000
3282A	Brass					40	7,600	13,600
3282B						50	9,000	16,300
3282C	Steel					90	15,200	28,100
A3282C						70	14,000	25,000
7574	Brass	1½"	1½"	2¼"	1¾"	75	14,200	24,800
7574L						100	18,100	32,700
3292A	Steel	2"	2"	2⅞"	1⅞"	122	22,100	37,600
A3292A								
3292B								
A3292B								
A3292C	Steel							

* 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 Valves for Container Service

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.



Part Number	For Use With This Type Coupling	Inlet Connection M. NPT	Outlet Connection NPT	Wrench Hex Flats	Approximate Closing Flow*		
					Liquid (GPM Propane)	Vapor SCFH (Propane)	
						25 PSIG Inlet	100 PSIG Inlet
A8523	Half	3/4"	3/4" Male	1 1/8"	15	5,170	8,800
A8525	Half	1 1/4"	1 1/4" Male	1 3/4"	35	12,540	21,560
A7537L4	Half	2"	2" Male and 1 1/4" Female	2 5/8"	75	13,000	25,600
A7537L4F	Full				125	25,000	42,500
A7537N4	Half				150	30,500	52,000
A7537N4F	Full				150	30,500	52,000
A7537P4	Half	3"	3" Male and 2" Female	3 3/4"	150	32,100	55,500
A7537P4F	Full				200	39,400	68,300
A7539R6	Half				250	51,100	88,700
A7539R6F	Full						
A7539T6	Half						
A7539T6F	Full						
A7539V6	Half						
A7539V6F	Full						

* 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 Valves for Vapor or Liquid

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.



Part Number	Inlet Connection NPT	Outlet Connection F. NPT	Wrench Hex Flats	Approximate Closing Flows***		
				Liquid (GPM Propane)	Vapor SCFH (Propane)	
					25 PSIG Inlet	100 PSIG Inlet
A2137	2"	2" Male and 1 1/4" Female	2 7/16"	50	10,000	17,000
A2137A				70	14,000	25,000
2139	3"	3" Male and 2" Female	3 1/2"	125	26,500	46,000
2139A				160	32,700	57,200

* 1 1/2" 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.

Excess Flow Valves for Flange Mounting in Container Service

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.



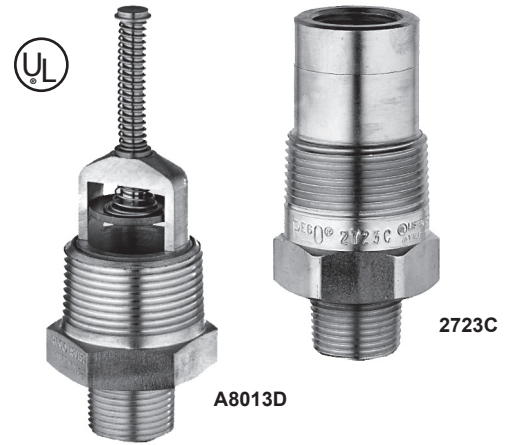
Part Number	Inlet Connection NPT	For Installation	Approximate Closing Flows*		
			Liquid (GPM Propane)	Vapor SCFH (Propane)	
				25 PSIG Inlet	100 PSIG Inlet
A3500L4	2"	Slotted Body	75	13,000	22,500
A3500N4			125	25,000	42,500
A3500P4			150	30,500	52,000
A3500R6	150		32,100	55,500	
A3500T6	200		39,400	68,300	
A3500V6	250		51,100	88,700	
A4500Y8	4"		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.

Excess Flow Valves for Liquid or Vapor Withdrawal

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.



Part Number	Inlet Connection M. NPT	Outlet Connection NPT	Wrench Hex Flats	Approximate Closing Flow**		
				Liquid (GPM Propane)	Vapor SCFH (Propane)	
					25 PSIG Inlet	100 PSIG Inlet
A8013D	1 1/4"	3/4"	1 1/8"	39	8,700	14,700
A8013DA		1"		44		
A8013DB		1 1/4"		55	10,900	19,300
2723C	1 1/4"	3/4"	1 1/16"	20	3,900	6,900

* 3/8" 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

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.



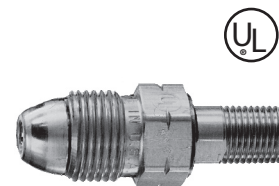
Part Number	Inlet Connection M. NPT	Outlet Connection F. NPT	Wrench Hex Flats	Approximate Closing Flow*		
				Liquid (GPM Propane)	Vapor SCFH (Propane)	
					25 PSIG Inlet	100 PSIG Inlet
2884D	3/4"	1/4"	1 1/16"	N/A	60	110

* 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

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.



Part Number	Inlet Connection	Outlet Connection	Wrench Hex Flats	Approximate Closing Flow*		
				Liquid (GPM Propane)	Vapor SCFH (Propane)	
					25 PSIG Inlet	100 PSIG Inlet
3199W	Male POL	1/4"	7/8"	.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

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 3/4" 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.

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 unthread 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®

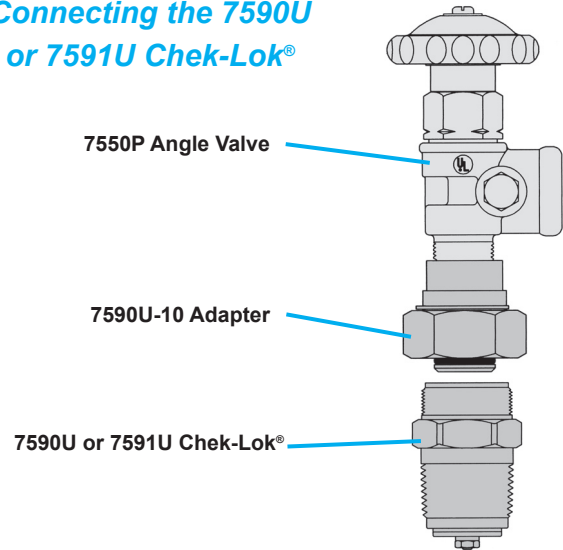
- 1 To re-lock the Chek-Lok, container pressure must be in excess of 35 PSIG. Close shut-off valve and disconnect the hose or piping.
- 2 Open shut-off valve fully. Liquid discharging to the atmosphere should cause the excess flow feature of the Chek-Lok to close, provided tank pressure is 35 PSIG or 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.

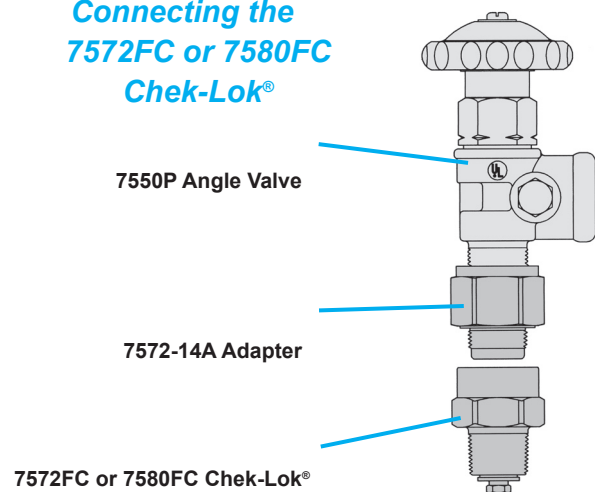
- 3 After the excess flow valve closes, remove the Adapter and Shut-Off Valve Assembly.
- 4 Clean face of Chek-Lok and install the Cap with a gasket. IMPORTANT: Only use the proper Chek-Lok Cap. Do not use a standard pipe cap.

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.

Connecting the 7590U or 7591U Chek-Lok®



Connecting the 7572FC or 7580FC Chek-Lok®



In the absence of a 7550P transfer valve, a 3/4" 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.

7590U and 7591U Chek-Lok® Valves

Designed with unique 1" NPS threads on both Chek-Lok® outlet and adapter inlet. This helps prevent activation of the Chek-Lok® without use of the 7590U-10 adapter. Extra strength connection between body and adapter provides increased strength. An o-ring seal on adapter provides a gas tight seal before the adapter opens the equalizing stem.

These 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.



**7590U
with Cap**



**7590U-10
Union Style Adapter**

Chek-Lok® Number	Inlet Connection	Outlet Connection	Body Wrench Hex Flex	Approximate Effective Length	Cap Wrench Hex Flats	Approximate Closing Flow, Liquid GPM (Propane)*
7590U	¾" M. NPT	1½" UNF	1½"	1⅞"	1⅞"	20
7591U	1¼" M. NPT		1¾"	1⅞"		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.

Union Style Adapters for 7590U and 7591U

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	Wrench Hex Flats
7590U-10	1½" UNF	¾" F. NPT	1¾"

Chek-Lok® Liquid Evacuation Adapter for 7590U and 7591U Valves

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.

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



Adapters for the 7572FC and 7580FC

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	Wrench Hex Flats
7572C-14A	¾" M. NPT	¾" F. NPT	1"
7572C-15A		¾" M. NPT	



7572C-14A



7572C-15A

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.

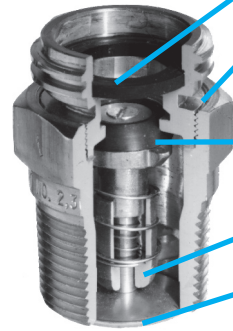
The double back check construction allows emergency inspection, repair, or replacement of the upper fill assembly without removing product from the container. When the upper filler valve body is removed, the lower back check valve provides a seal, permitting only some leakage, allowing a new upper filler valve body to be installed.

Spare Gasket Ordering Information

ACME	Part Number
1¼"	A2797-20R
1½"	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.

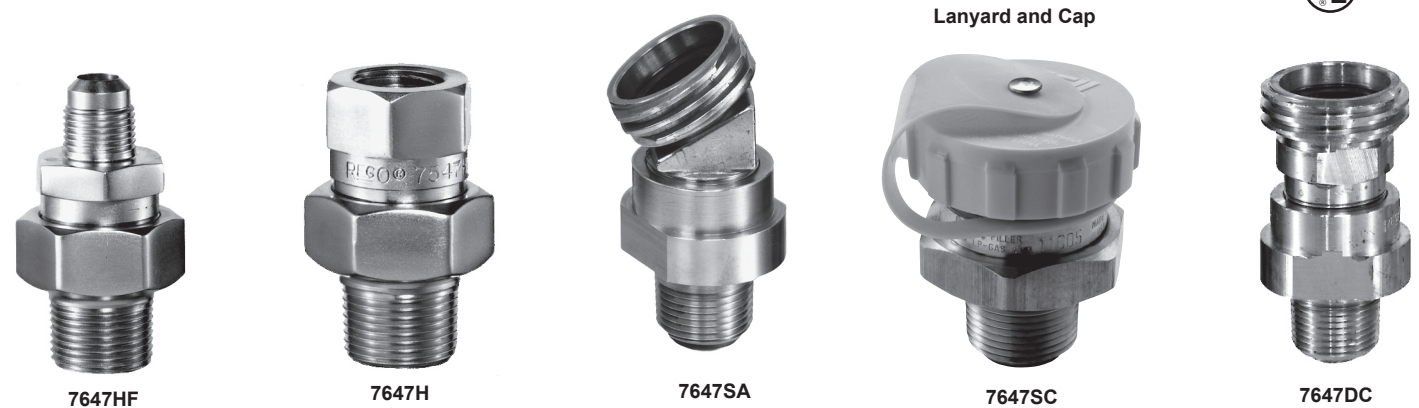
Seat disc of special synthetic composition is extra thick for longer life.

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 Forklift, Motor Fuel and RV Tanks

Designed to provide fast filling of forklift, motor fuel, and recreational vehicle tanks.



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 ⅞"	14	20	24	27	50
7647HF	-	½" SAE Flare			2 ⅝"					
-	7647DC	1¼" ACME & F. POL			3"					
-	7647SA**	1¼" ACME			3 ⅞"					
-	7647SC*			1¾"	2¼"					

* Large 1¾" hex wrench flats.
 ** 30° angle on 1-1¼" ACME hose connection.
 *** Multiply flow rate by .94 to determine liquid butane capacity.

Double-Check Filler Valves for Large Motor Fuel and ASME Tanks

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.



Part Number		ACME Hose Connection	Tank Connection M. NPT	Wrench Hex Flats	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	1 1/4"	1 1/4"	1 1/8"	50	70	111	157	192
7579P	-		1 1/4"		37	52	82	116	142
6579**	6579C**		1 1/4"		78	110	174	246	301

* Incorporates 3/4 F. NPT dip pipe connection

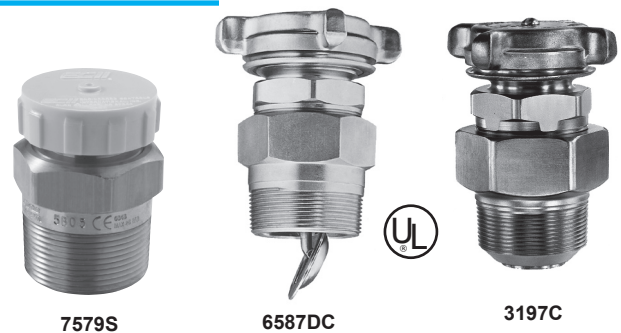
** Swing-away lower back check valve design for higher filling rate.

NOTE: Multiply flow rate by .94 to determine liquid butane capacity.

Double Check Filler Valves for Delivery Truck Tanks and Large Storage Containers

Designed to provide fast filling of bobtails, transports and large bulk storage tanks.

The 6587CD 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.



Part Number	ACME Hose Connection	Tank Connection M. NPT	Wrench Hex Flats	Propane Liquid Capacity at Various Differential Pressures (GPM)				
				5 PSIG	10 PSIG	25 PSIG	50 PSIG	75 PSIG
7579S	1 1/4"	1 1/2"	2"	44	62	98	139	170
6587DC*	2 1/4"	2"	2 7/8"	92	130	206	291	356
3197C	3 1/4"	3"	4"	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

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.



3174C



3194C, 6584C

Part Number	ACME Hose Connection	Outlet Connection M. NPT	Wrench Hex Flats	Propane Liquid Capacity at Various Differential Pressures (GPM)				For Use With Back Check Valve:
				5 PSIG	10 PSIG	25 PSIG	50 PSIG	
3174C	1 1/4"	1 1/4"	1 1/4"	23	33	52	74	3176
6584C*	2 1/4"	2"	2 3/8"	156	220	348	492	A3186
3194C	3 1/4"	3"	3 1/2"	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

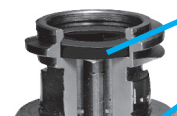
General Information

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.

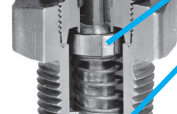
RegO® Vapor Equalizing Valves are designed for use in both ASME and DOT containers.



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

Double Check Vapor Equalizing Valves for ASME and DOT Containers

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.



Part Number		ACME Hose Connection	Tank Connection M. NPT	Wrench Hex Flats	Approx. Closing Flow at 100 PSIG Inlet Pressure (SCFH/Propane)
Basic	W/ Chain & Cap				
7573D	7573DC	1 1/4"	3/4"	1 1/4"	4,100
-	3183AC	1 3/4"	1 1/4"	2"	10,000

Single Check Vapor Equalizing Valves for ASME and DOT Containers with Supplementary Excess Flow Valves

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.



Part Number		Inlet Connection	Outlet Connection	Wrench Hex Flats	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"	7.600	3272E
-	3180C	1 3/4"	1 1/4"	1 3/4"	10,000	3282A

Back Pressure Check Valves

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.

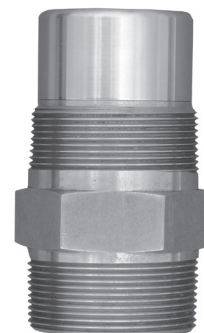
Back Pressure Valves for Container or Line Applications

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.



A3176



A3187S

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" M & 1 1/4" F	2" M & 1 1/4" F	2 3/8"	4 3/8"	60	110	225	350
	A3196	3"	3"	4"	3 15/16"	297	420	664	939

*Soft seat version.

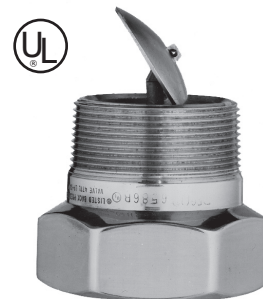
NOTE: Multiply flow rate by .94 to determine liquid butane capacity and by .90 to determine liquid anhydrous ammonia capacity.

Swing-Away Back Pressure Check Valves for Container or Line Applications

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.



Part Number		Inlet Connection F. NPT	Outlet Connection M. NPT	Wrench Hex Flats	Propane Liquid Capacity at Various Differential Pressures (GPM)			
Brass	Steel				5 PSIG	10 PSIG	25 PSIG	50 PSIG
6586C	A6586C	2"	2"	2 1/4"	190	270	420	600

NOTE: Multiply flow rate by .94 to determine liquid butane capacity.

Back Pressure Check Valves for Flanged Installation

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.



A3400L6

Part Number	Flange Connection M. NPT	Wrench Hex Flats	Overall Length	Propane Liquid Capacity at Various Differential Pressures (GPM)			
				5 PSIG	10 PSIG	25 PSIG	50 PSIG
A3400L4	2"	Slotted	5 1/4"	223	316	500	707
A3400L6	3"		5 5/32"	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.

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.

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.

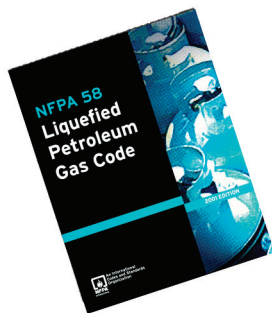
ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM

ECII Engineered Controls
International, Inc.

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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

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, 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

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 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.

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

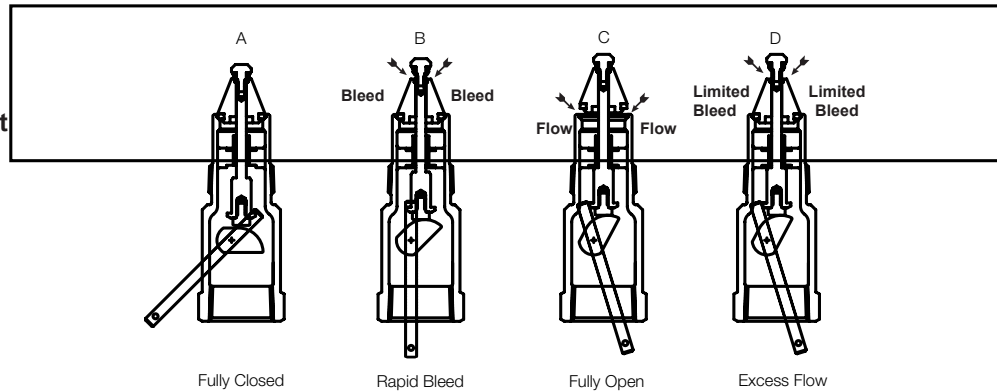
1. Internal Valve Will Not Open.
Causes may be excess leakage downstream, pump engaged too quickly, excessive wear of valve, or ice freezing of poppet.
When there is excessive volume downstream, a greater amount of time is required to equalize tank and downstream pressure.
To determine if the pilot seat 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

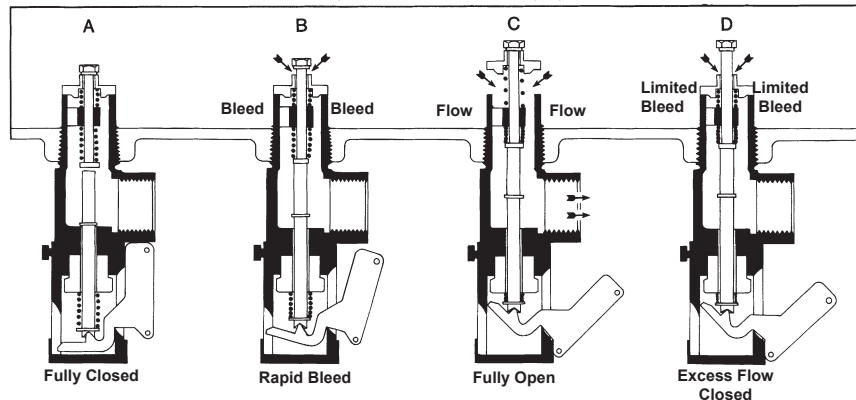
Potential problems may be eliminated with preventive internal valve maintenance. Perform the following steps once a month:

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.

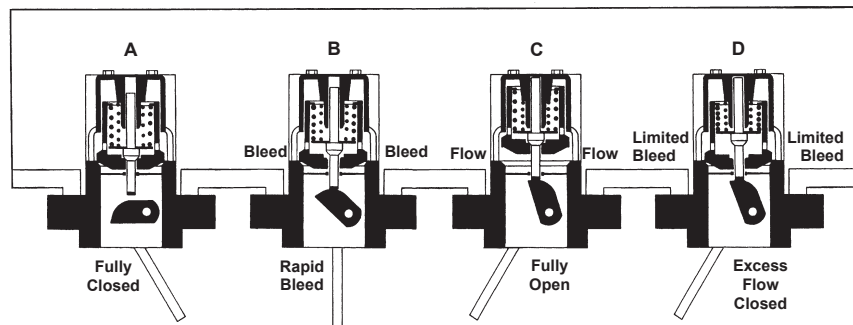
**A3209R Series, 1¼" Straight
A3212R & RT Series, 2"
A3213A & T Series, 3"**



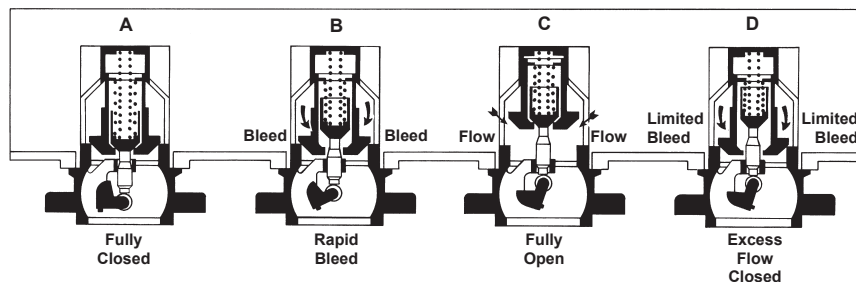
A3210A Series, 1¼" Angle



**A3217F Series, 3" Flanged
A3217DF Series,
3" Double Flanged**

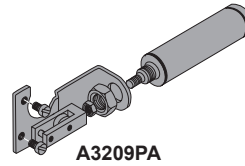


A3219F Series, 4" Flanged

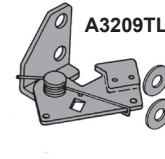


1¼" Threaded Internal Valve for Small Capacity Pumping Systems and Bobtail Vapor Equalization

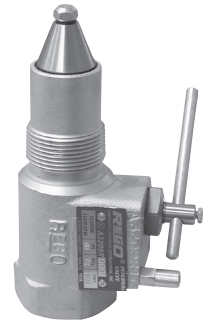
Designed primarily for use with LP-Gas and anhydrous ammonia as a main valve on small capacity pumping systems, NH₃ nurse tanks and in-line installations. It may also be installed in the vapor equalizing opening on bobtail delivery trucks. Installation is quick and easy, and it fits in both full and half couplings, as well as, in-line applications. The valve may be actuated manually by hand or cable.



A3209PA



A3209TL



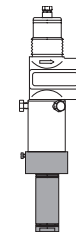
Part Number	Inlet Connection M. NPT	Outlet Connection F. NPT	Closing Flow		LP-Gas Vapor Capacity** (SCFH/Propane)		Accessories	
			LP-Gas	NH ₃	25 PSIG	100 PSIG	Thermal Latch	Pneumatic Actuator
A3209R050	1 1/4"	1 1/4"	50	45	13,300	22,900	A3209TL	A3209PA
A3209R080	1 1/4"	1 1/4"	80	72	15,700	26,700	A3209TL	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

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 NH₃ 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.



A3210PA



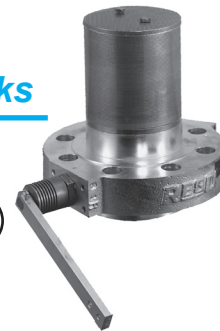
Part Number	Inlet Connection	Outlet Connection	Closing Flow (GPM)		LP-Gas Vapor Capacity (SCFH/Propane)				Accessories
			LP-Gas	NH ₃	25 PSIG Inlet	50 PSIG Inlet	75 PSIG Inlet	100 PSIG Inlet	Pneumatic Actuator
A3210A065	1¼"	1¼"	65	58.5	17,000	22,250	26,500	30,000	A3210PA-R1

* 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%.

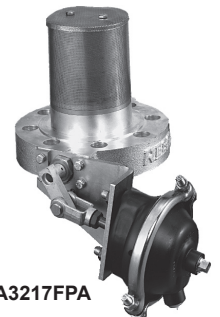
3" Flanged Internal Valve for Bobtail Delivery Trucks, Transports, and Large Stationary Storage Tanks

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.



A3217FPA



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 16 nuts and 8 studs for mounting.

** Modified bore = 4½" diameter with 5½" diameter raised face.

4" Flanged Internal Valve for Transports and Large Stationary Storage Tanks

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.

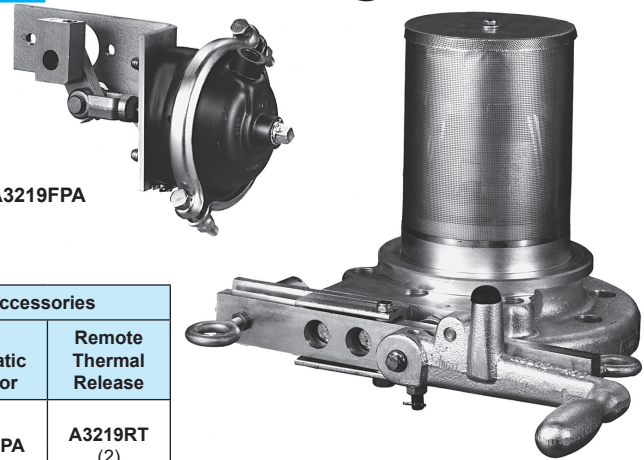
Use of the A3219RT Remote Thermal Release with this valve is suggested to provide a remote means of mechanical closure along with thermal protection, as required by DOT MC331.

A3219FPA

Part Number*	Inlet Connection	Outlet Connection	Closing Flow GPM		Accessories	
			LP-Gas	NH ₃	Pneumatic Actuator	Remote Thermal Release
A3219FA600L	4" 300# ANSI RF Modified Flange**	4" 300# ANSI RF Flange	600	544	A3219FPA	A3219RT (2)
A3219FA400L			400	360		

* Valve supplied with 16 nuts and 8 studs for mounting.

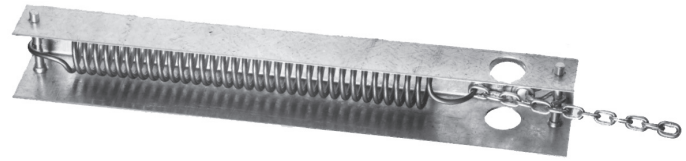
** Modified bore = 5 1/8" diameter with 7" diameter raised face.



Remote Thermal Release for DOT MC331 Pressure Vessel

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.



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

Remote Cable Controls for Internal Valves

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.



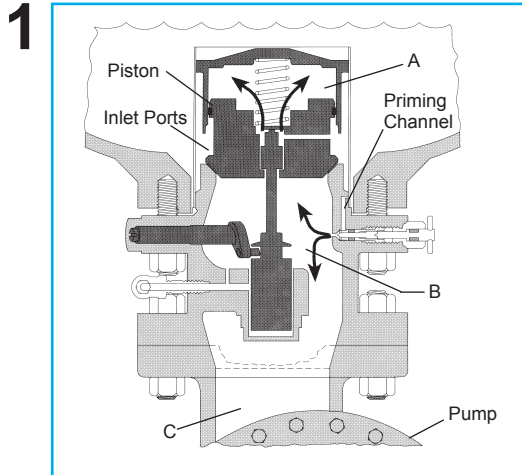
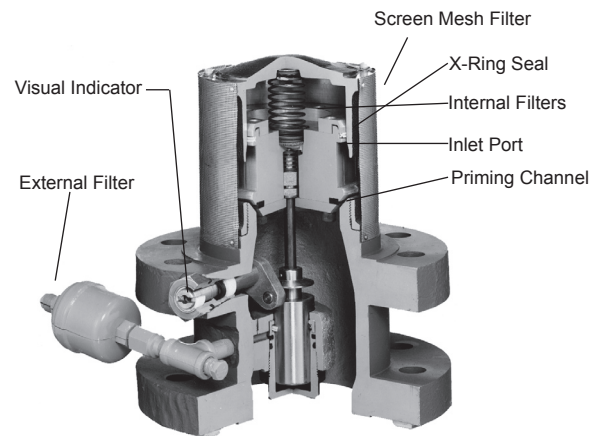
Part Number	Description	Contents
3200C	Remote Cable Kit	100 Foot Cable, 6 Cable Clamps, Quick Link, Sign, Fuse Link, Steel Nut and Bolt
3200L	Operating Lever	Lever Assembly

Flomatic® Internal Valve Operation

General Information

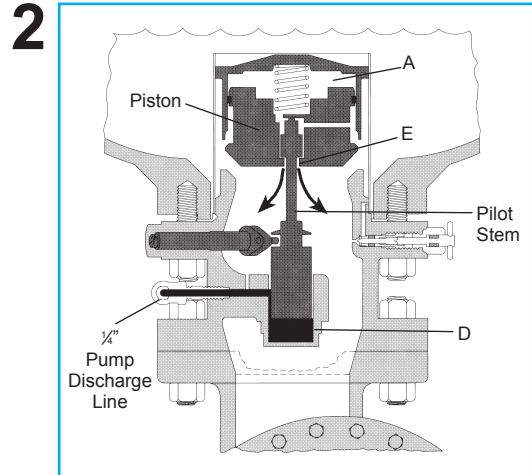
RegO® piston type Flomatic® Internal Valves are normally closed and use pressure differential to provide completely automatic service. Mounted directly between the tank body and pump, the Flomatic® uses the pressure differential developed by the pump to open the valve and it closes automatically when 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.



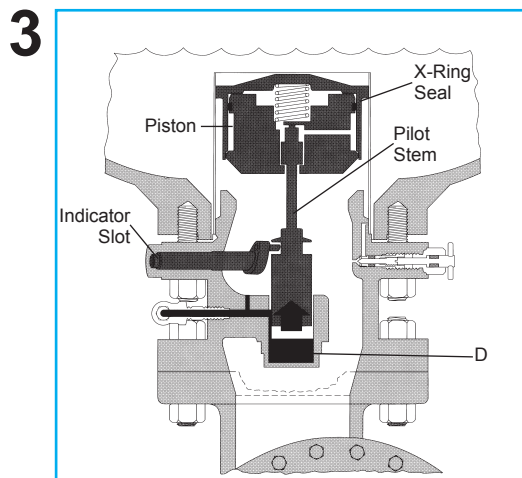
1. Normally Closed

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**.



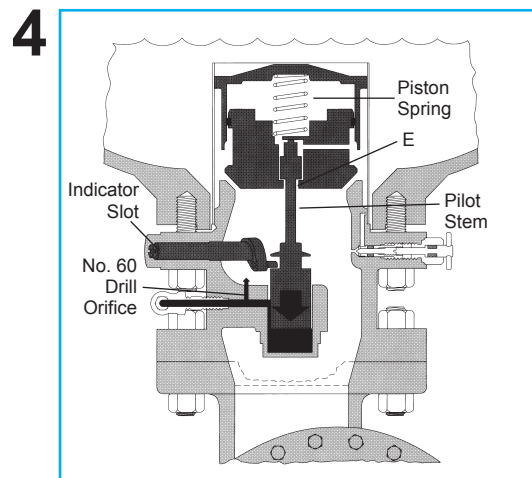
2. Pump On – Valve Opening

When the pump is started, differential pressure transmits through the 1/4" 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. 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. Pump Off – Valve Closes

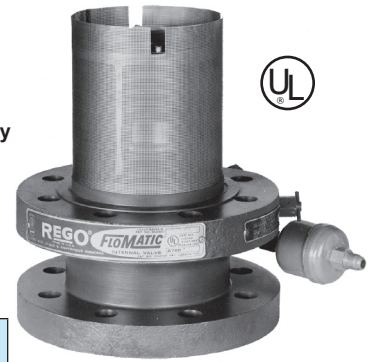
With the pump shut off, the pressure in area **D** which holds the valve open, bleeds out through the **#60 DRILL ORIFICE**. This loss of pressure permits the **SPRING** to push the **PILOT STEM** down to reseat at point **E**. Since pressures are equal above and below the **PISTON**, with no sustaining 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

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.



A7853A 1/4" Three-Way Quick-Acting Valve



Part Number	Inlet Connection ANSI Flange	Outlet Connection ANSI Flange	Strainer Width	Base Width	Overall Height (Approx.)	Height from Indicator to Base	Accessories (included with Flomatic®)	
							Filter	3-Way Valve
A7883FK	3"-300#**	3"-300#	4 3/4"	8 1/4"	10 7/8"	4 13/16"	A7884-201	A7853A
A7884FK	4"-300#***	4"-300#	5 3/4"	10"	11 1/4"	4 15/16"		

*Supplied with A7853A 3-way valve, A7884-201 filter, studs, nuts and gaskets.

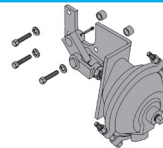
**With 4 1/8" diameter bore.

***With 5 1/8" diameter bore.

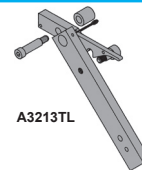
Threaded Internal Valves For Bobtail Delivery Trucks, Transports and Stationary Storage Tanks

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.



A3213PA



A3213TL

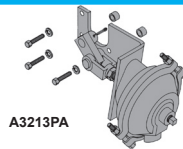


Part Number	Inlet Connection M. NPT	Outlet Connection F. NPT	Closing Flow (GPM) Half Coupling		Closing Flow (GPM) Full Coupling		A	B	C	Accessories	
			LP-Gas	NH3	LP-Gas	NH3				Thermal Latch	Pneumatic Actuator
A3212R105	2"	2"	105	95	65	59	1 9/16"	4 11/16"	4 1/8"	A3213TL	A3213PA
A3212R175			175	158	100	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					

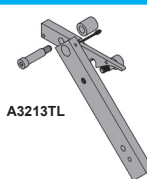
Threaded Internal Valves For Bobtail Delivery Trucks, Transports and Stationary Storage Tanks

Application

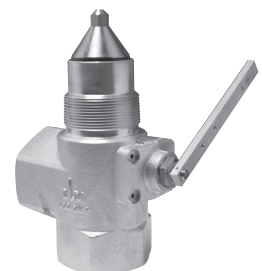
Designed primarily for use with LP-Gas and anhydrous ammonia for liquid withdrawal; vapor transfer or vapor equalization of bobtail delivery trucks, transports, stationary storage tanks, and in-line installations. The valve may be operated manually by cable or pneumatically.



A3213PA



A3213TL



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				Thermal Latch	Pneumatic Actuator
A3212RT105	2"	2"	105	95	65	59	1 9/16"	4 11/16"	4 1/8"	A3213TL	A3213PA
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					

Extended Type Hose Couplings for Vapor and Liquid Service

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.

Part Number	Type of Service	Hose Connection (M. NPT)	Coupling Connection (F. ACME)	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.



A7571 Series



A7575 Series

Short Type Hose Couplings for Vapor and Liquid Service



Style A
For Liquid Filling



Style B
For Liquid Filling



Style C
For Vapor Equalizing



Style D
For Vapor Equalizing

Part Number	Material	Style	Hose Connection (M. NPT)	Coupling Connection (F. ACME)	Tailpiece Bore	Hose End To Nut	Overall Length
3175B	Brass	A	1/2"	1 3/4"	3/64"	2"	2 7/8"
3175			3/4"		3/4"		
3175A			1"		3/4"		
3185	Brass Nut & Steel Nipple	B	1 1/4"	2 1/4"	1 3/16"	2 1/16"	3 1/8"
3195			2"	3 3/4"	1 1/16"	2 1/8"	3 5/8"
A3175	Steel	A	3/4"	1 3/4"	3/4"	2"	2 7/8"
A3175A			1"		3/4"		
A3185			1 1/4"	2 1/4"	1 3/16"	2 1/8"	3 1/8"
A3195	Brass	B	2"	3 3/4"	1 13/16"	2 1/8"	3 5/8"
3171			3/8"	1 1/4"	13/32"	1 3/16"	2 7/16"
3171A			1/2"		17/32"		
3181			3/4"		1 1/16"	2"	3 1/4"
3181A		C	1"	1 3/4"	15/16"	1 7/8"	3 5/8"
3191			1 1/4"		3/16"	2 1/8"	3 5/16"
3191			1 1/4"	2 1/4"	3/16"	2 1/8"	3 5/16"

ACME Check Connectors for Lift Trucks

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.



7141M



7141F

Part Number	Application	Inlet	Outlet	Protective Cap*	
				Rubber	Brass
7141M	Service Valve	3/8" F. NPT	1 1/4" M. ACME	7141M-40	7141FP
7141F	Fuel Line	1 1/4" F. ACME	1/4" F. NPT	-	-

* Recommended to minimize foreign material entering valves which could result in leakage.

Unloading Adapters for Container Evacuation

Designed to provide an efficient means of evacuating an LP-Gas container for relocation or repair. They thread directly onto the 1 3/4" 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.



3119A



3121



3120

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			

Filler Hose Adapters

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.

Part Number	Built-in Vent Valve	Filler Valve Connection	Hose Connection
7577V	Yes	1 3/4" F. ACME	1 3/4" M. ACME
3179B	No		



3179B



7577V

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.

Part Number	Material	(M. ACME)	Chain & Ring Fits Pipe Size Up To:
C5763N	Nylon	1 1/4"	3/4"
C5765N		1 3/4"	1 1/4"
5765PR	Brass		Not Applicable
C5767N	Nylon	2 1/4"	1 1/4"
C5769N		3 1/4"	2"



POL Plugs

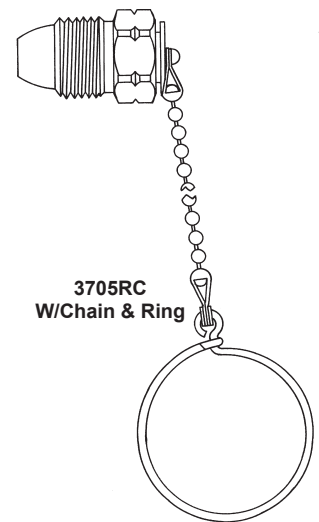
Highly recommended for installation in LP-Gas cylinder valve POL outlets whenever the service line is disconnected or when the cylinder is being transported.

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.

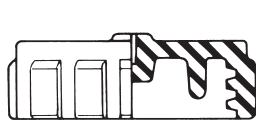
Part Number	Material	Connection
N970P	Cyclac	M. POL (CGA 510)
10538P	Brass	
3705RC		



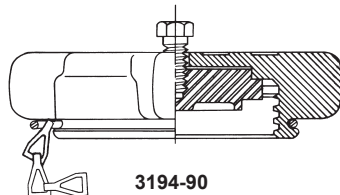
10538P
(Has hole for attaching wire to prevent loss of plug)



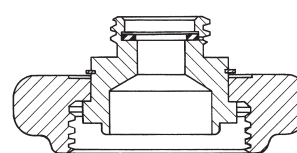
Caps and Reducers



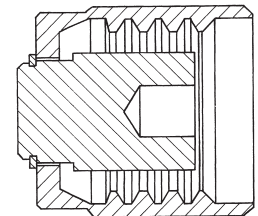
3144-91
Plastic Cap



3194-90
Metal Cap



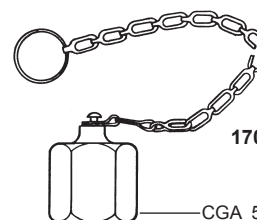
A5776
Reducer Coupling



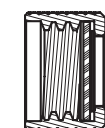
7141FP Cap Plug

Cap With Chain & Ring		Cap Only Part Number	Material	Thread Connection
Part Number	Ring Fits Pipe Size Up To:			
3144-91	¾"	3144-9P	Cyclac	1¼" F. ACME
3174-91		3174-9P		1¾" F. ACME
3174-93	1¼"		A8016-9P	
A8016-93				
1708	¾"	-	Brass	F. POL (CGA 510)
7141FP	1¼"			1¼" F. ACME
3175P				1¼" F. ACME
3184-90				2"
3194-90	3"			3194-9
-	-	5776*	Steel	2¼" F. ACME
A3184-90	2"	-		3¼" F. ACME
A3194-90	3"			A5776*
-	-	-	Brass	1⅞" F. ACME
907FP	1"	-		

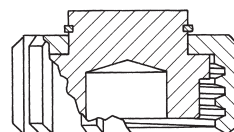
* Reduces to 1 3/4" M. ACME



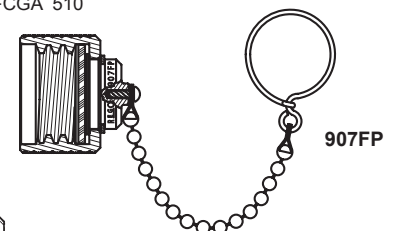
1708C POL Cap



CGA 510



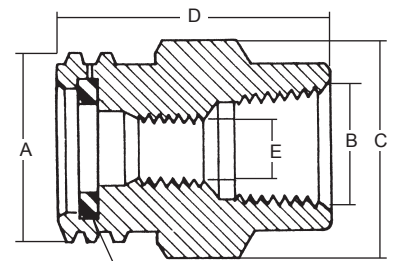
3175P Cap Plug



907FP

ACME Adapters

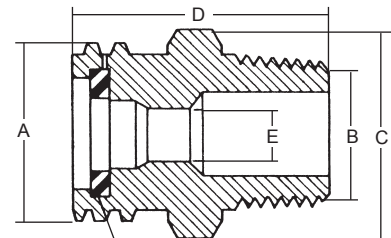
Part Number	Material	A M. ACME	B F. NPT	C Hex	D	E Diameter	For Spare Gasket Order Part No.
5764A	Brass	1¾"	¼"	1¾"	1½"	¾"	A2697-20R
5764B			⅜"				
5764C			½"				
5764D			¾"				
5764E			1"				
5766E		2¼"	1"	2¼"	2 ⅝"	1⅞"	A3184-8R
5766F			1¼"				
5768G		3¼"	1½"	3½"	3⅝"	2⅞"	A3194-8R
5768H			2"				
5768J			2½"				
A5764D	Steel	1¾"	¾"	1¾"	2 ⅜"	¾"	A2697-20R
A5764E		1"					
A5768H		3¼"	2"				



Gasket (Furnished with adapter)

ACME x Female NPT

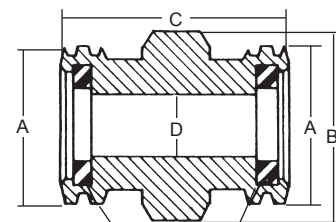
Part Number	Material	A M. ACME	B F. NPT	C Hex	D	E Diameter	For Spare Gasket Order Part No.
5763D	Brass	1 1/4"	3/4"	1 1/4"	1 3/4"	7/16 "	A2797-20R
5765D		1 3/4"	3/4"	1 3/4"	1 7/8"	1 1/16 "	A2697-20R
5765E			1"		2 1/8"	3/4"	
5767F			1 1/4"				
5767F		2 1/4"	1 1/4"	2 1/4"	2 3/16 "	1 3/16 "	A3184-8R
5767G			1 1/2"			1 3/8 "	
5767H			2"		2 7/8 "	2 7/16 "	
5769H		3 1/4"	2"	3 3/8 "	2 7/8 "	1 1/8 "	A3194-8R
5769J			2 1/2"	3 1/4"	3 1/2"		
5769K			3"	3 1/2"	3 5/8 "	2 1/8 "	
A5765C	Steel	1 3/4"	1/2"	1 3/4"	2 3/16 "	1 7/32 "	A2697-20R
A5765D			3/4"			1 1/16 "	
A5765E			1"			7/8 "	
A5765F			1 1/4"			1 5/16 "	
A5767F		2 1/4"	1 1/4"	2 1/4"	2 3/8 "	1 3/16 "	A3184-8R
A5769H		3 1/4"	2"	3 1/4"	2 7/8 "	1 1/8 "	A3194-8R
A5769K			3"		3 13/16 "	2 1/8 "	



Gasket (Furnished with adapter)

ACME x Male NPT

Part Number	Material	A M. ACME	B F. NPT	C Hex	D Diameter	For Spare Gasket Order Part No.
5765M	Brass	1 3/4"	1 3/4"	2 1/16"	7/8"	A2697-20R
5767M		2 1/4"	2 1/4"	2 5/16"	1 25/64"	A3184-8R
5769M		3 1/4"	3 1/4"	2 3/4"	2 1/8"	A3194-8R

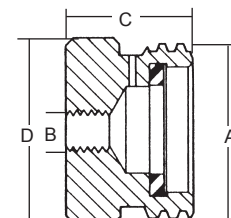


Gasket (Furnished with adapter)

ACME x ACME

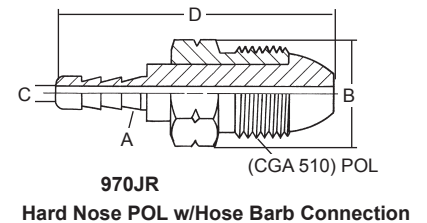
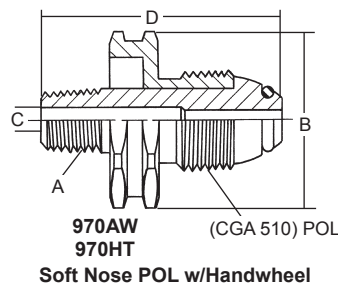
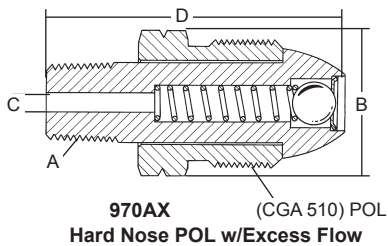
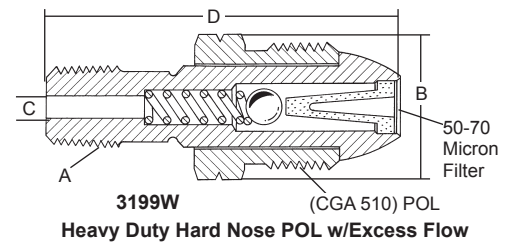
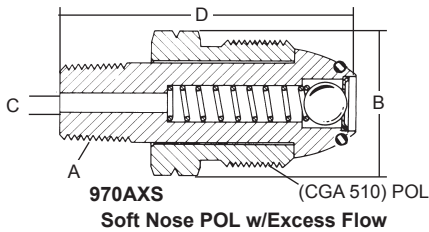
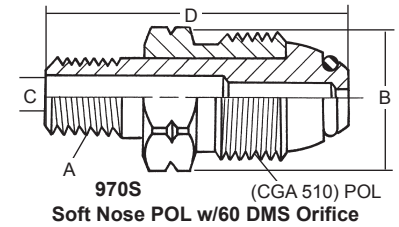
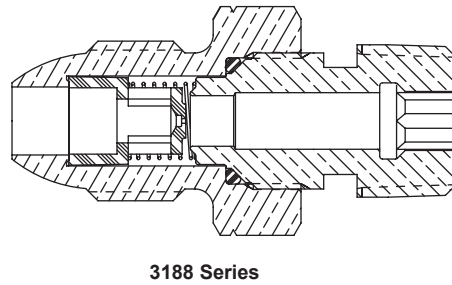
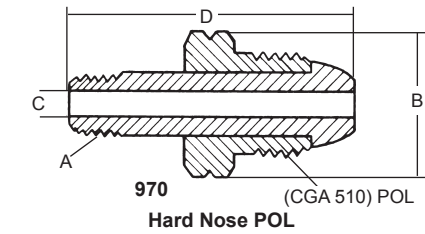
Part Number	Material	A M. ACME	B F. NPT	C Hex	D Diameter	For Spare Gasket Order Part No.
A5764W	Steel	1 3/4"	3/8"	1 1/4"	1 1/16"	2697-20

* 3/8" -16 UNC Thread.



ACME x Miscellaneous
(Recommended for securing
hose-end valve when not in use).

Male POL Swivel Adapters

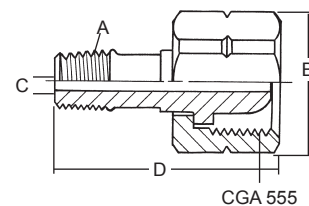


Part Number	Material	A	B Hex	C Drill	D	Vapor at 100 PSIG Inlet (SCFH)	Liquid (GPM)
970	Brass	1/4" M. NPT	7/8"	5/16"	2 3/8"	-	-
970S				3/16"	2 3/32"		
970AX				5/16"	2 5/64"	404	1.10
970AXS			2 7/16"		450	0.95	
3199W			1 3/8"	3/16"	2 3/32"	-	-
970AW							
970HT							
970JR	1/4" Hose Barb	7/8"	5/32"	2 5/8"			
3188A	???	???	1 1/8"	5/16"	2 1/2"	350	.95
3188B						700	1.9
3188C						1180	2.9

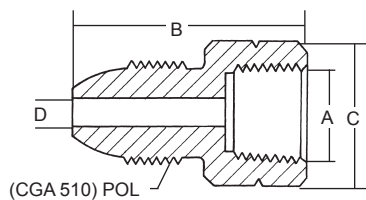
Note: All nipples incorporate wrench hex section.

CGA 555 Swivel Adapters

Part Number	Material	A	B Hex	C Drill	D
12982	Brass	1/4" M. NPT	1 1/4"	3/16"	1 15/16"
12982G		9/16" -18NF			



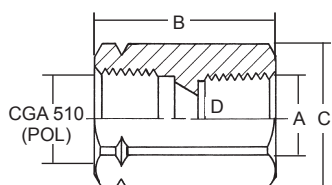
POL Adapters



Male POL x Female NPT

Ordering Information

Part Number	Material	A M. ACME	B	C Hex	D Diameter
2906A	Brass	1/4"	1 3/8"	1 5/16"	1/4"
2906G		1/2"	2"	1 1/8"	



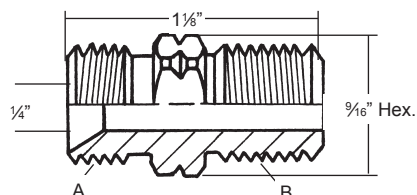
Female POL x Female NPT and Female POL

Ordering Information

Part Number	Material	A	B	C Hex	D Diameter
5760Z	Brass	1/8"	1 5/8"	1 1/8"	5/16"
5760A		1/4"			13/32"
5760B		3/8"			35/64"
5760C		1/2"			43/64"
5760D		3/4"			13/32"
5760S	POL (CGA 510)	2 1/8"	1 1/8"		

Hose Adapter

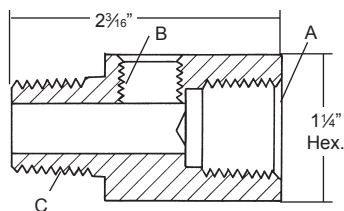
For use with fuel gases (LP-Gas, Acetylene).



Ordering Information

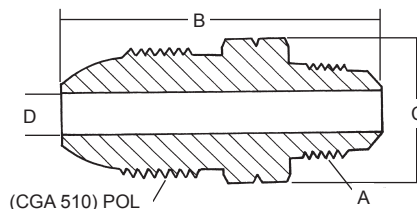
Part Number	Material	A	B
1300	Brass	9/16" - 18NF (L.H.)	1/4" M. NPT

Pressure Gauge Adapter



Ordering Information

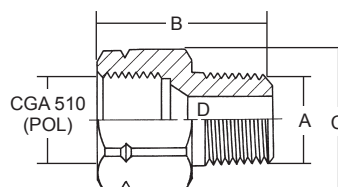
Part Number	Material	A	B	C
1494-1	Brass	1/2" F. NPT	1/4" F. NPT	1/2" M. NPT



Male POL x Male NPT and SAE Flare

Ordering Information

Part Number	Material	A	B	C Hex	D Diameter
2906D	Brass	3/8" M. NPT	2 1/16"	1 5/16"	1 1/32"
2906F		3/8" SAE Flare		7/8"	9/32"
2906E		1/2" SAE Flare	2 1/4"		



Female POL x Male NPT

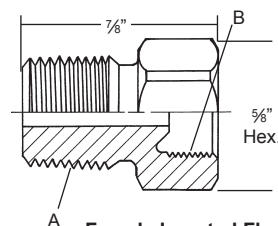
Ordering Information

Part Number	Material	A	B	C Hex	D Diameter
5761A	Brass	1/4"	1 5/8"	1 1/8"	3/16"
5761B		3/8"			13/32"
5761C		1/2"			7/16"
5761D		3/4"			

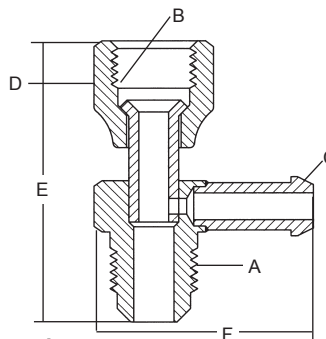
Miscellaneous Adapters

Ordering Information

Part Number	Material	A	B
15774-1	Brass	1/4" M. NPT	Female Inverted Flare



Female Inverted Flare x Male NPT



Ordering Information

Part Number	Material	A	B	C	D	E	F
1328	Brass	5/8" - 18 UNF	5/8" - 18 UNF	1/4" Hose Barb	1 3/16"	2"	1 1/2"
1331		3/4" - 16 UNF	3/4" - 16 UNF		1 5/16"	2 1/8"	
1332		7/8" - 14 UNF	7/8" - 14 UNF		1 1/16"	2 1/2"	1 1/4"

1" Rotogages® for Large Mobile and Stationary Containers

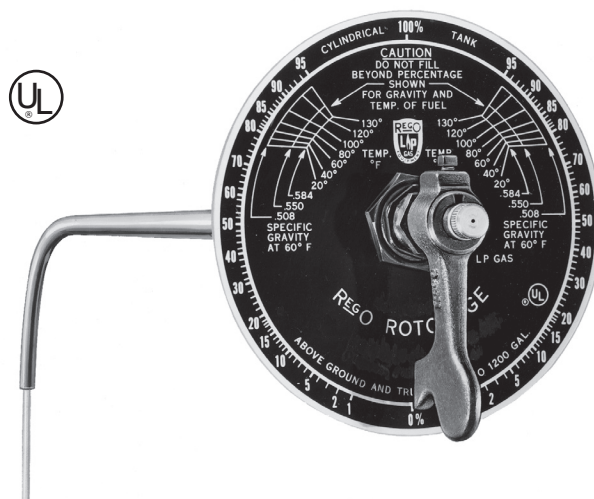
Rotogages® are designed to provide an accurate determination of LP-Gas or anhydrous ammonia container contents. They mount in a standard 1" NPT coupling on large mobile or stationary containers.

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.

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



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

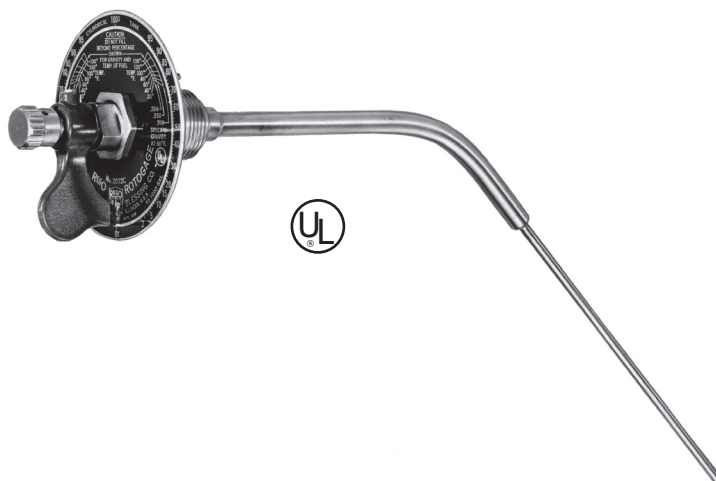
NOTE: The dip tube must be cut to the required length ($\frac{1}{2}$ " of container inside diameter minus $5\frac{3}{4}$ ").

$\frac{3}{4}$ " Rotogages® for Small Stationary and Mobile LP-Gas Containers

Rotogages® are designed to provide accurate determination of LP-Gas container contents. They may be end or side mounted in a standard $\frac{3}{4}$ " 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".

Part Number		For Containers with Inside Diameter	Tank Connection	Valve Seat Orifice
Rotogage®	Dip Tube			
2070CO	2071-L25.7	Up to 40"	$\frac{3}{4}$ M. NPT	No. 54 Drill Size
	2071-L39.7	Up to 60"		

NOTE: The dip tube must be cut to the required length ($\frac{1}{2}$ of container inside diameter minus $\frac{1}{2}$ "), when mounted on center line of tank.



Sight Flow Indicators for Bulk Plants

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.



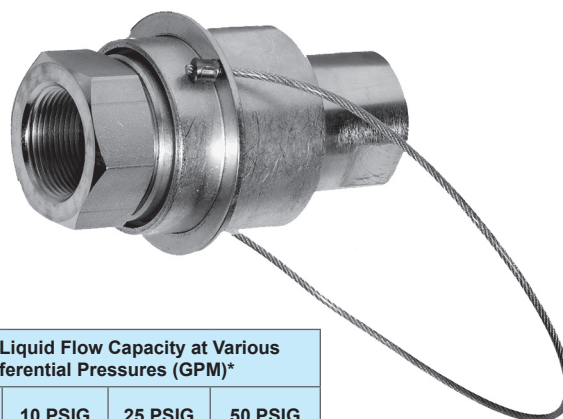
Part Number	Inlet/Outlet Connections	Length
A7794	2" F. NPT	5 3/4"
A7796	3" F. NPT	7 3/8"

Pull-Away Valves for Transfer Operations

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.



Part Number	Inlet/Outlet Connections NPT F.	Disconnect Force Approx-lbs	Reconnect Force Approx-lbs	Length Of Valve	LP-Gas Liquid Flow Capacity at Various Differential Pressures (GPM)*			
					5 PSIG	10 PSIG	25 PSIG	50 PSIG
A2141A6	3/4"	130	80	3 7/8"	11	16	25	36
A2141A6L**								
A2141A8	1"	75	50	4 9/16"	21	30	47	67
A2141A8L**								
A2141A10	1 1/4"	160	25	5 5/8"	52	75	120	170
A2141A16	2"	300	50	14 5/16"	250	350	550	750

* To Determine NH₃ liquid flow capacity, multiply by .90.

2" "Swing-Chek" ESVs for Bulk Plants

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.

Part Number	For Use Only With:	Inlet and Outlet Connections	Liquid Flow Capacity at 10 PSIG Pressure Drop (GPM)
6016	LP-Gas	2" F. NPT	475 (LP-Gas)
AA6016	NH ₃		427 (NH ₃)

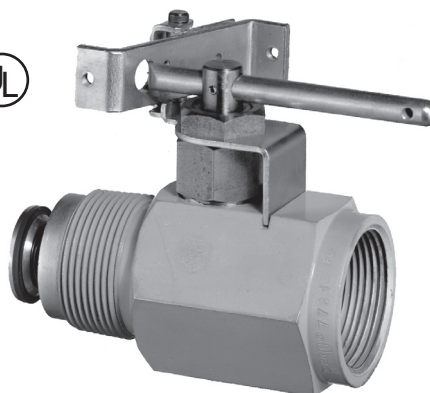
* Must be actuated pneumatically, manually by cable or by cable connection to pull-away valve.



1 1/4" ESV for LP-Gas Bulk Plants

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.

Part Number	For Use Only With:	Inlet Connections 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	1 1/4"	1 1/4"	26,000	55



ESV Remote Cable Controls

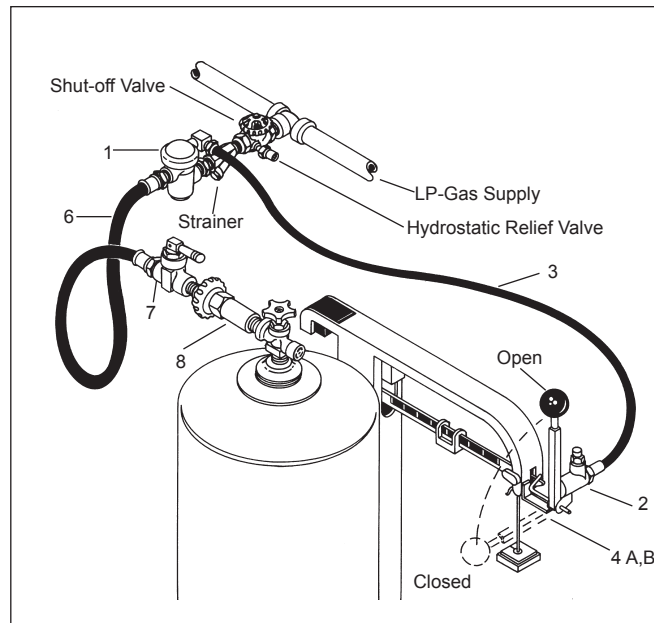
Part Number	Description
7606RM	Remote manual cable release kit. Permits manual closing of one or more ESVs from remote location.
7606RT	Remote thermal cable release kit. Provides high temperature closing of ESV. Required is ESV is more than 5 feet from nearest end of hose.
7606RM-1	100' roll of extra cable.
6016-60D	Pneumatic remote kit for 6016 and AA6016 ESV
6016-60C	Pneumatic remote open / remote close actuator

ESV Pneumatic Controls

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 1/4" pneumatic tubing.
7605AP-16	1/4" tubing tee, with nuts.
7605AP-15	1/8" NPT x 1/4" tubing, straight connector.

Hydraulic Automatic Cylinder Filling System

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.



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			7194HD
1	Propane Control Valve	½" NPT Female, with ¼" NPT Female Hydraulic Connection	7177
2	Master Cylinder, with Actuator Lever	⅛" NPT Hydraulic Connection	7188
3	Hydraulic Hose Assembly	⅜" 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.

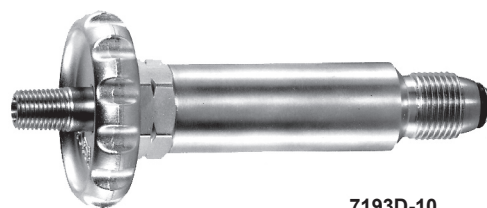
NOTE: Part No. 7188HS contains items 1, 2, 3, 4B and 5. Part No. 7188MS contains items 1, 2, 3, 4A and 5.

Hose End Adapters for DOT Cylinder Filling

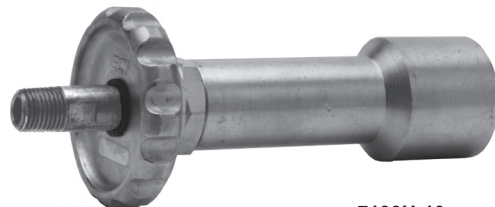
Designed to provide quick and easy filling of DOT cylinders with POL or Type I connections. This adapter may be used with hydraulic and electric automatic systems or with manual systems in conjunction with a RegO® 7901TB Quick Acting Shut-Off Valve.

These filling connectors have an extended connection on the handwheel, 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	Applications	Inlet Connection	Outlet Connection	Materials
7193D-10	Filling of DOT Cylinders with POL Connections	1/4" M. NPT	M. POL (CGA 510)	Brass & Stainless Steel
7193U-10	Filling of DOT Cylinders with Type I Connections		Type 1 Connection (1 1/8" M. ACME)	Brass



7193D-10



7193U-10

Connector for DOT Cylinder Filling Adapter

The 7193T-10 is designed for use on the 7193D-10 Filling Adapters. Connector allows adapter to be used on the 1 1/8" M. ACME & F. POL connections of Type 1 valves.

Part Number	Applications	Inlet Connection	Outlet Connection	Materials
7193T-10	Converts 7193D-10 Adapters from POL to a Type 1 Connection	M. POL CGA 510	Type 1 Connection (1 1/8" M. ACME)	Brass



7193T-10

Hose End Adapter for Lift Truck Cylinder Filling

The 7193L-10A is designed to provide quick and easy attachment of the filling hose to DOT cylinders equipped with RegO® 7141M check connectors.

Part Number	Application	Inlet Connection	Outlet Connection	Body Material	Accessories
					Adapter
7193L-10A	Filling of Fork Lift Cylinders*	1/4" M. NPT	1 1/4" 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.

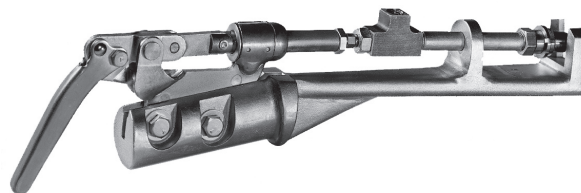


Lever Operated Hose End Adapter for Fork Lift Cylinder Filling

Designed to drastically reduce labor and time when continuously filling large numbers of lift truck cylinders equipped with RegO® 7141M check connectors.

Part Number	Application	Inlet Connection	Outlet Connection	Materials
7193K-10B	Lever Operated for Quick Filling of Fork Lift Cylinders	1/4" F. NPT	Quick Disconnect Yoke*	Brass and Steel

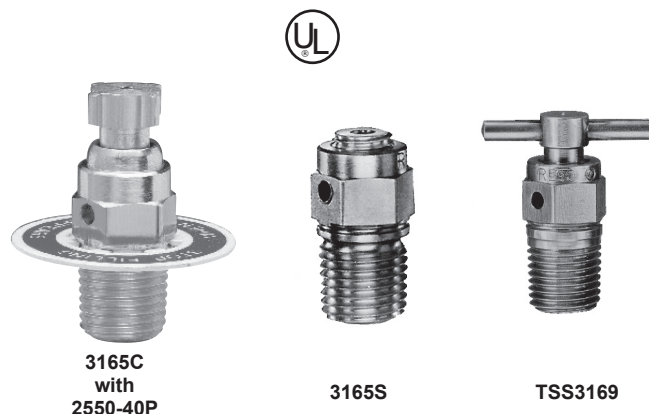
* For use with RegO® 7141M check connector.



Vent Valves

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.

Part Number	Service	Connection	Actuation	Accessories
				Warning Plate Kit
3165C	LP-Gas Only	1/4" M. NPT	Knurled	2550-40P
3165S			Slotted	
TSS3169	LP-Gas & NH ₃		Tee Handle	



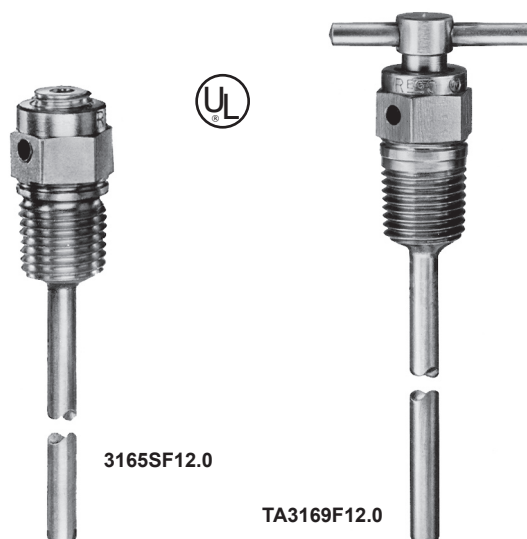
Fixed Liquid Level Gauges

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.

Part Number	Service	Connection	Actuation	Dip Tube Length	Accessories
					Warning Plate Kit
3165CF*	LP-Gas Only	¼" M. NPT	Knurled	*	2550-40P
3165CF12.0			Slotted	12"	
3165SF12.0					
TA3169F12.0	LP-Gas & NH3		Tee Handle		

* Dip tube must be ordered separately. Add to suffix.
Example: 11" Dip Tube = 3165F11.0.



Spanner Wrench for ACME Connectors

This aluminum spanner wrench is especially designed for use with 2 1/4" and 3 1/4" ACME couplings, adapters and caps.

Part Number	For Use With ACME Connector Size
3195-50	2 1/4" & 3 1/4"



Combination Valve for Bulk Storage Containers

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.

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

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.

Part Number	Inlet Connection	Outlet Connection
12802	1/4" F. NPT	1/4" M. NPT



Pressure Gauges

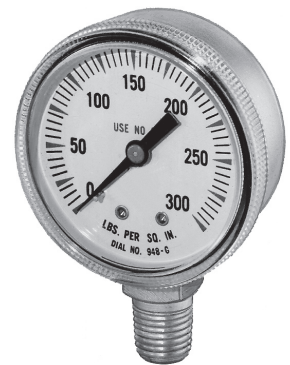
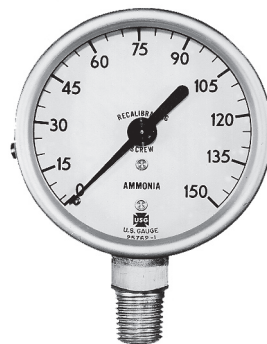
Especially designed in a variety of sizes and construction for the LP-Gas and anhydrous ammonia industry.

All Rego® pressure gauges have a 1/4" M. NPT connection unless otherwise noted.

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	100 PSIG		2½"
5576		Brass			
1286		Steel			
1178		Brass			
948			300 PSIG	2"	5 PSI
948B		Steel			
1183		Brass	500 PSIG		20 PSI
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



Needle Valves

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 1314, 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.



Part Number	Inlet Connection	Outlet Connection	Height	Length
1224WA	¼" M. NPT	¼" M. NPT	1 ⅞"	1¾"
1314WA	⅜" - 18 L.H.	⅛" M. NPT		
1316WA		¼" M. NPT		

Household Gas Detector/Alarm

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.

Part Number	Description
100-HGD	Household Propane Gas Alarm



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Part Number	Page	Part Number	Page	Part Number	Page
100-HGD	.91	A2805C	.90	3200L	.75
301 Series	.16	2884D	.62	Part Number	Page
302 Series	.16	2906 Series	.83	A3209R Series	.74
PK302A	.17	2962	.21	A3209PA	.74
LV404B Series	.14	JT3000 Series	.91	A3209TL	.74
597 Series	.17	3119A	.79	A3210A Series	.74
901-400	.31	3120	.79	A3210PA-R1	.74
901C1	.30	3125 Series	.44	A3212R & RT Series	.77
901C3	.30	AA3126 Series	.43	A3213A & T Series	.77
901C5	.30	3127 Series	.44	A3213PA	.77
903-400	.31	3129 Series	.44	A3213TL	.77
907FP	.80	AA3130 Series	.43	A3217 Series	.74
907NFD Series	.26	3131 Series	.43	A3217FLPA	.74
912 Series	.19	3132 Series	.43	A3217FPA	.74
913 Series	.19	3133 Series	.43	A3219F Series	.75
948 Series	.90	3135 Series	.43	A3219FPA	.75
970 Series	.20, .82	AA3135 Series	.43	A3219RT	.75
N970P	.80	3144-9P	.80	3226A-3	.90
1178	.90	3144-91	.80	3272 Series	.60
1183	.90	3146 Series	.68	A3272 Series	.60
1212KIT	.22	A3146	.68	3282	.60
1224 WA	.91	A3149 Series	.43	A3282 Series	.60
1286	.90	3165 Series	.89	3292 Series	.60
1300	.83	TA3169	.89	A3292 Series	.60
1314 WA	.91	TSS3169	.89	LV3403TR	.12
1316 WA	.91	3170	.68	A3400 Series	.69
1328	.83	3171 Series	.78	A3500 Series	.61
1331	.83	3174C	.67	JT3700 Series	.91
1332	.83	3174-9P	.80	3705RC	.80
1350E	.21	3174-91	.80	JT4100 Series	.91
1350R	.20	3174-93	.80	LV4403-400	.22
1450E	.21	3175 Series	.78	LV4403B Series	.13
1450R	.20	A3175 Series	.78	LV4403SR Series	.12
1494-1	.83	3175P	.80	LV4403TR Series	.12
1519A Series	.59	3176	.68	LV4403Y Series	.12
A1519A Series	.59	A3176	.68	A4500Y8	.61
1519B Series	.59	3179B	.79	LV5503B Series	.13
A1519B Series	.59	3180C	.68	LV5503G4	.13
1519C Series	.59	3181 Series	.78	LV5503Y Series	.12
1580M Series	.18	3183AC	.67	5547	.90
AA1580M Series	.18	3184-90	.80	5575	.90
X1584M Series	.19	A3184-90	.80	5576	.90
1708C	.80	3185 Series	.78	5724B23	.15
2070 Series	.84	A3185 Series	.78	5725B23	.15
A2141A Series	.85	A3186	.68	5744B4	.15
A2137	.61	A3187S	.68	5745B4	.15
A2137A	.61	3191	.78	5760 Series	.83
2139 Series	.61	3194-9	.80	5761 Series	.83
2302-31	.20	3194-90	.80	5763D	.81
LV2302A2	.16	A3194-90	.80	C5763N	.80
LV2302P	.16	3194C	.67	5764 Series	.81
JT2400 Series	.91	3195-50	.89	A5764 Series	.81
2411	.90	3195 Series	.78	5765 Series	.81
2434A	.21	A3195 Series	.78	A5765 Series	.81
2434 Series	.90	A3196	.68	C5765N	.80
2503-19	.20	3197C	.66	5765PR	.80
2503-22	.20	3188 Series	.82	5766 Series	.81
2723C	.62	3199W	.20, .62, .82	5767 Series	.81
		3200C	.75		

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A5767F	.81	7554 Series	.52	A8018DP	.54
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5768 Series	.81	7560-55	.45	A8020D	.54
A5768H Series	.81	7560-56	.45	SS8021 Series	.44
5769 Series	.81	A7571 Series	.78	SS8022 Series	.44
A5769 Series	.81	7572-400	.69	A8060	.90
C5769N	.80	7573 Series	.67	A8150	.90
5776	.80	7574	.60	A8400	.90
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LV6503 Series	.13	7579	.66	G8475R Series	.34
6532 Series	.36	7579C	.66	A8523	.60
6533 Series	.36	7579P	.66	A8525	.60
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6579 Series	.66	7590U-10	.64	8544 Series	.41
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6586C	.69	7591U	.64	8555DL11.6	.35
A6586C	.69	7605APN-1	.86	8555D Series	.35
6587DC	.66	6016	.86	8555R Series	.35
7053T	.51	6016-60C	.86	8556	.29
7141F	.79	6016-60D	.86	A8560 Series	.45
7141FP	.80	AA6016	.86	A8570 Series	.45
7141M	.79	7605PN-50	.86	AA8570 Series	.45
7177	.87	7606RM	.86	8593AR16.0	.34
7188	.87	7606RT	.86	8684G	.42
7193D-10	.88	7647 Series	.65	8685G	.42
7193K-10B	.88	7704 Series	.50	9091 Series	.84
7193L-10A	.88	A7704 Series	.50	9092 Series	.84
7193R-10	.89	7705P	.50	9093 Series	.84
7193T-10	.88	A7705P	.50	9094 Series	.84
7193U-10	.88	7706P	.50	A9095 Series	.84
7194HD	.87	A7706P	.50	9101C1	.30
7194MD	.87	A7707L	.49	9101D Series	.30
A7505 Series	.47	A7708L	.49	9101H5	.30
A7506 Series	.47	7781AF	.86	9101H6	.30
A7507 Series	.47	7781AFPN-1	.86	9101P5 Series	.31
A7508 Series	.47	A7793A	.49	9101P6 Series	.31
A7509 Series	.47	A7794	.85	9101R Series	.30
A7510 Series	.47	A7796	.85	9101Y5H	.30
A7511 Series	.47	A7797A	.49	9103 Series	.27
A7512 Series	.47	A7853A	.77	9103T9F	.27
A7513 Series	.47	A7883FK	.77	9106CO	.28
A7514 Series	.47	A7884FK	.77	9107K8A	.28
A7517 Series	.47	A7884-201	.77	10538P	.80
A7518 Series	.47	TA7894P	.53	12472	.60
7525B Series	.14	7901T Series	.51	12802	.90
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A7553A	.51				

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