



LP-Gas & Anhydrous Ammonia Equipment

ECII *Engineered Controls
International, Inc.*

Section E Globe and Angle Valves

E

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

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

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

From time to time buyers might call to ask ECII for technical advice based upon limited facts disclosed to ECII. If ECII furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, ECII shall not be liable for such technical advice or any such advice provided to buyer by any third party and buyer assumes all risks of such advice and the results thereof.

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

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.

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).

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.

Warning

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

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

Notice

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

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

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

Filters

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

The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

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LP-Gas Hose-End Filling Valves (With ACME Connectors)

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 - 2004 Edition, "Liquefied Petroleum Gas Code" states 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 306-88, "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 LPGas 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.



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

Inspection of Quick Acting Filling Valves

- Valves should be inspected daily to make sure locking mechanism functions properly.
- The ACME threads should be examined for wear, dents or nicks and the seating area should be clean and smooth.
- The retaining ring on the filler connection should be examined to make sure it is properly holding the female ACME rotating nut or handle so as to keep the surface that seats on the filler valve gasket protected.
- If any problems are evident, valves should be immediately replaced or repaired.

Larger Filler and Filling Valves

For 2¼" and 3¼" valves with ACME connections, use only the special wrenches designed for the purpose.

Do not use pipe wrenches or hammers to tighten the connections. All of the previous warnings about the smaller valves also apply here.

General Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging components made of materials such as rubber and metal. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential. Because ECII® products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because a filler valve or a filling valve is used beyond its safe service life. Life of these valves is determined by the environment in which they "live." The LP-Gas dealer knows better than anyone what this environment is. Note: There is a developing trend in state legislation and in proposed national legislation to make the owner of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of the legislation which could affect them.

Quick-Acting Minimum Loss Hose-End Valves for Bobtail Delivery Trucks and Dispensing Stations A7793A and A7797A

Application

Designed to vastly reduce the amount of product vented when disconnecting bobtail delivery trucks, dispensing systems and anhydrous ammonia nurse tanks.

These valves provide instant, full-on flow at the flip of a handle. Shut-off is instant and the handle locks for added protection. This "top of the line" hose-end valve is a fully contained unit that does not require additional filling adapters or connectors.

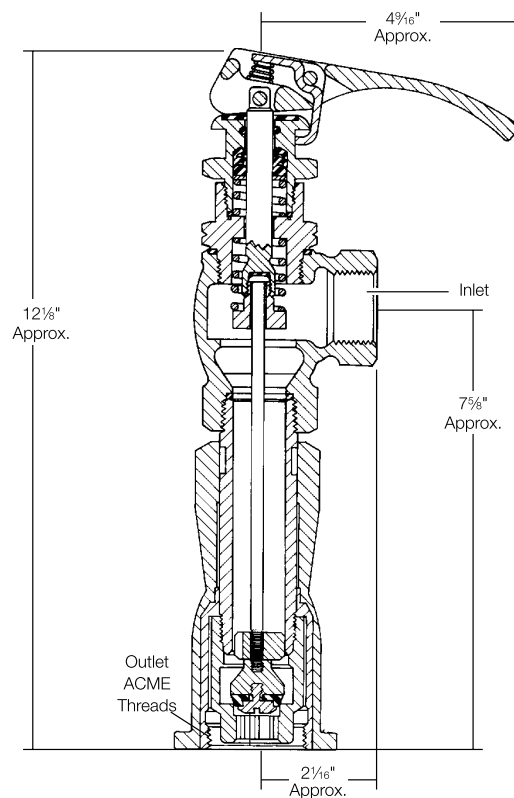
Features

- Minimizes product venting loss, when disconnecting, instantly by housing the seat disc at the bottom of the built-in ACME filling connector.
- Vents less than 2cc of liquid when disconnected.
- "V"-ring spring-loaded pressure seal design provides for dependable, leak-free operation. No packing to retighten or replace.
- Operator friendly. Contoured handle rotates a full 360° and large, easy to grip filling connector make the valve easy to handle.
- Self locking handle is operator opened and closed to prevent against accidental opening of the valve.



Materials

Body	Ductile Iron
"V"-Ring	Teflon
Stem	Stainless Steel
Seat Disc	Synthetic Elastomer
ACME Connector.....	Aluminum w/Steel Insert
Seal Housing	Stainless Steel
Lever.....	Stainless Steel
Bonnet	Cadmium Plated Steel



Ordering Information

Part Number	Inlet Connection (F. NPT)	Outlet Connection (F. ACME)	Locking Handle	Flow at 1 PSIG (Cv) Pressure Drop* (GPM/Propane)
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 A7707L and A7708L

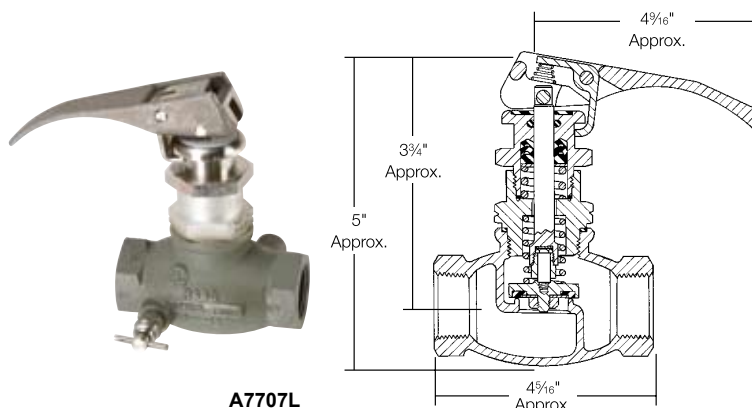
Application

Designed especially for safe operator handling of LP-Gas in bobtail delivery truck, dispensing systems and anhydrous ammonia nurse tank service.

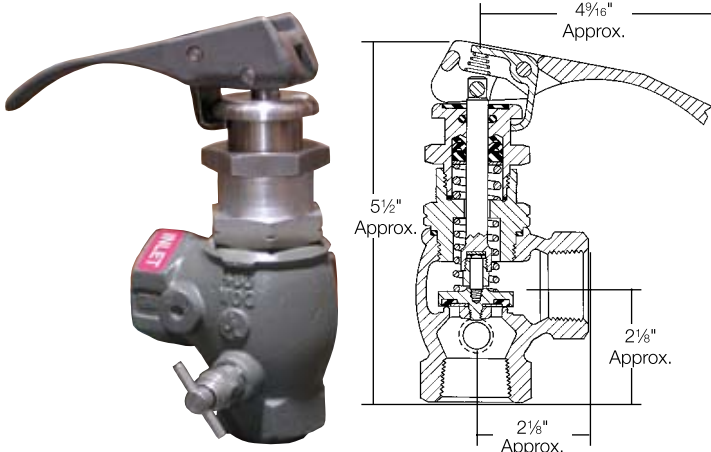
These valves provide instant, full-on flow at the flip of the handle and provide instant positive shut-off with a handle lock for added protection.

Features

- "V"-ring spring-loaded pressure stem seal provides for leak-proof operation. No packing to retighten or replace.
- Self locking handle is operator opened and closed to prevent against accidental opening of the valve.
- Large, contoured handle provides firm, comfortable grip.
- Full swivel handle rotates 360° so the valve can be operated from any angle.
- Built-in vent valve on the downstream side of the valve permits bleeding of trapped product to assure safe uncoupling.
- Can be used with a variety of RegO® filling adapter connectors.
- Swivel seat disc minimizes grinding on the body seat and assures longer service life.



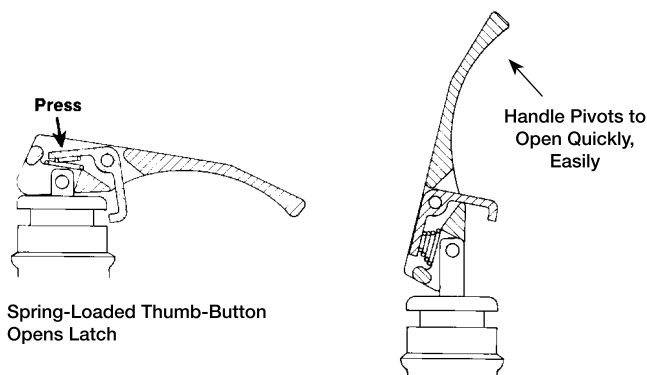
A7707L



A7708L

Materials

Body	Ductile Iron
"V"-Ring	Teflon
Stem	Stainless Steel
Seat Disc	Synthetic Elastomer
Valve Lever	Stainless Steel
Seal Housing	Stainless Steel
Bonnet	Cadmium Plated Steel



Ordering Information

Part Number	Body Design	Inlet & Outlet Connection (F. NPT)	Locking Handle	Flow at 1 PSIG 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 $\sqrt{9}$ = 66.0 GPM/propane. For NH₃ flow, multiply propane flow by .90.

** See appropriate catalog section for additional information.

Quick-Acting Valves for Crop Driers and Charging Manifold Hoses

7554 Series

Application

7554S Series valves provide instant shut-off and fast opening control on LP-Gas crop driers. They are also ideal for charging manifold hoses, stationary fuel transfer hoses and other applications requiring quick, positive shut-off. They are not for use with delivery truck hoses because the handle could snag on the ground and open the valve as the hose is reeled back to the truck.

7554L Series valves feature a locking handle device to help prevent accidental opening of the valve. It is ideal for all the same applications as the 7554S Series and may be used on delivery trucks as it incorporates the locking handle design.

Both valve series must be installed so that flow through the valve is opposite to that of a conventional globe valve. This allows the inlet flow to assist in closing the valve and prevents the valve from being opened by high pump pressures.

Features

- Quick-acting design speeds transfer operations, permitting rapid, one-handed opening and closing.
- Resilient seat disc provides positive shut-off.
- Flange seal stem design provides for leak-proof operation. No packing to retighten or replace.
- 7554L Series incorporates locking handle to prevent accidental opening of the valve.
- Vent valve installed on the downstream side of the valve permits bleeding of trapped product to assure safe uncoupling.
- Swivel seat disc minimizes grinding on the body seat and assures longer service life.

Materials

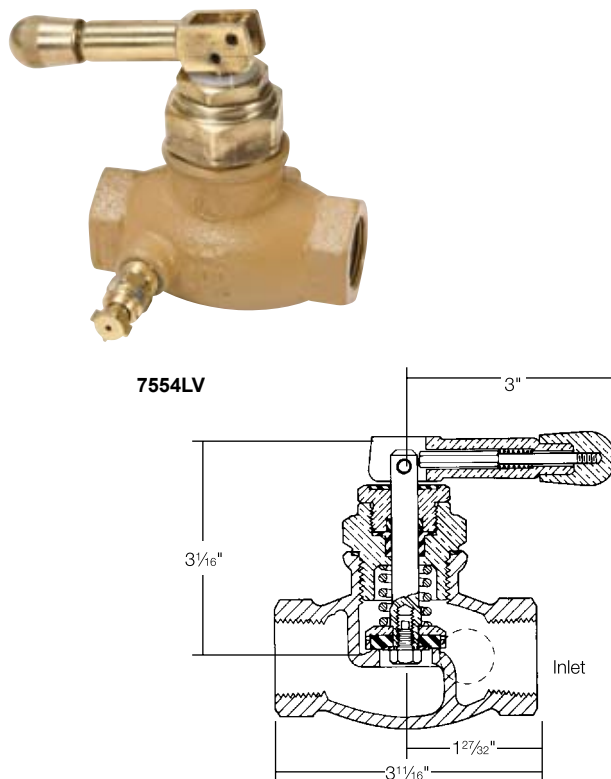
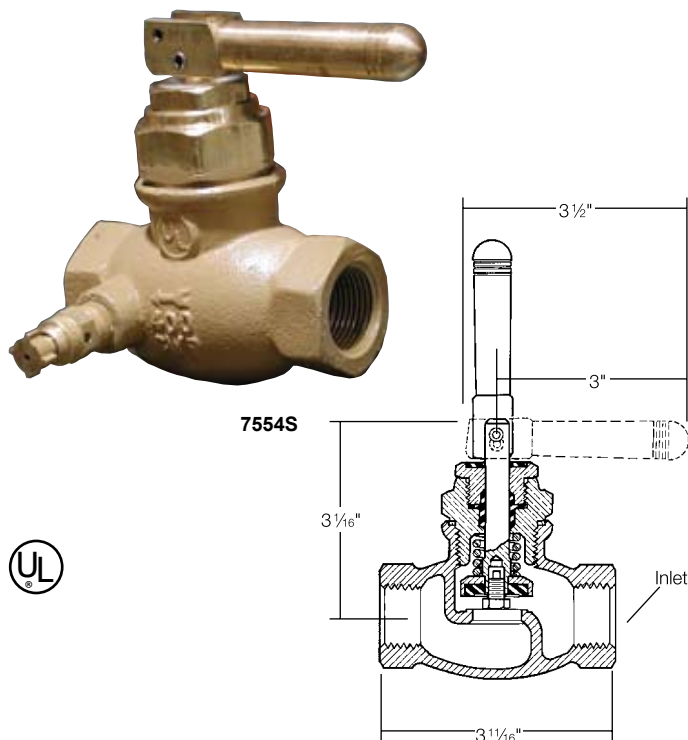
Body	Ductile Iron
Bonnet	Brass
"V"-Ring	Teflon
Stem	Stainless Steel
Seat Disc	Synthetic Elastomer
ACME Connector.....	Aluminum w/Steel Insert
Seal Housing	Stainless Steel
Lever.....	Stainless Steel



Ordering Information

Part Number	Inlet & Outlet Connection (F. NPT)	Locking Handle	Flow At 1 PSIG (Cv) Pressure Drop* (GPM/Propane)
7554SAV	1/2"	No	7.3
7554LAV		Yes	
7554SV	3/4"	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 = 11.5 X $\sqrt{9}$ = 34.5 GPM/propane.



Quick-Acting Valves for Cylinder Charging Hoses 7053T, A7553A, and 7901T Series

Application

Designed primarily for use on cylinder charging hoses to provide fast, convenient shut-off and fast opening.

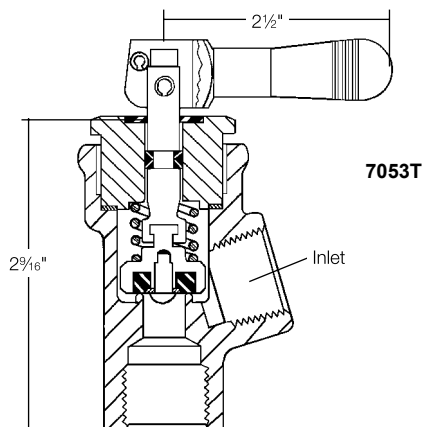
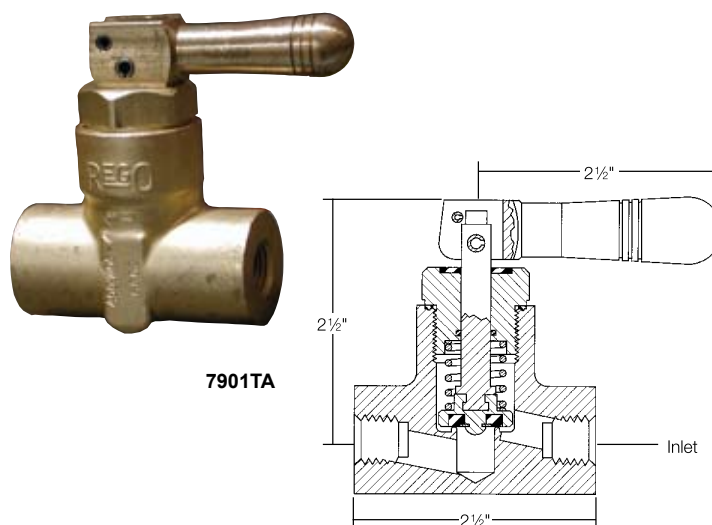
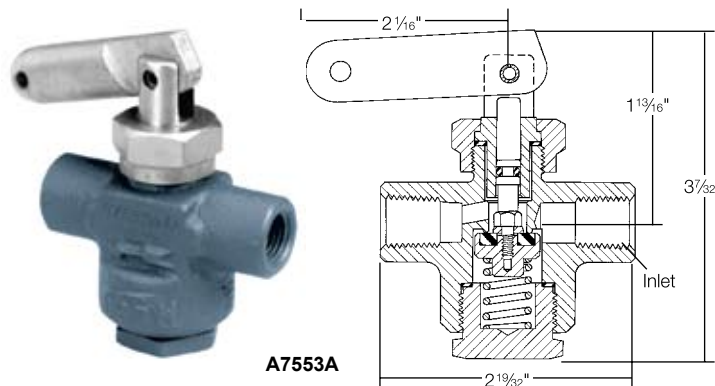
These valves must be installed so that flow through the valve is in the opposite direction to that of a conventional globe valve. This allows the inlet flow to assist in closing the valve, and even more important, helps prevent the valve from being forced open by high pump pressure.

Features

- Quick-acting design speeds transfer operations.
- Permits easy, one-handed opening and closing of the valve.
- O-ring stem seal design.
- Provides quick, positive shut-off.

Materials

Body (7053T, 7901)	Forged Brass
Body (A7553)	Ductile Iron
O-Ring	Resilient Synthetic Rubber
Bonnet Assembly (7053T, 7901)	Brass
Bonnet Assembly (A7553)	Steel
Seat Disc	Resilient Synthetic Rubber
Handle (7053T, 7901)	Brass
Handle (A7553)	Steel
Springs	Stainless Steel



Ordering Information

Part Number	Inlet Connection (F. NPT)	Outlet Connection (F. NPT)	Body Material	Flow At 1 PSIG (CV) Pressure Drop* (GPM/Propane)
7901T	1/4"	1/4"	Brass	1.95
A7553A			Ductile Iron	
7901TA	3/8"	3/8"	Brass	
7901TB	1/2"	1/4"		
7901TC		1/2"		
7053T				

* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: 7901T @ 9 PSIG = $\sqrt{9} \times 1.95 = 5.85$ GPM/propane. For NH3 flow, multiply propane flow by .90.

"V"-Ring Seal Globe and Angle Valves

General Information

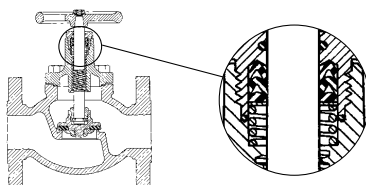
RegO® Globe and Angle Valves are designed and manufactured especially to meet the rigid requirements of the LP-Gas industry. The high quality construction and wide variety of sizes and styles also make them highly suited to many other industries such as anhydrous ammonia, chemical and petrochemical.

These ductile iron valves are available in both threaded and flanged connections. Threaded connections are available in 1/2" F. NPT to 3" F. NPT sizes. Flanged connections are available in 1 1/2", 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 1/4" 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 3/4" drilling for accommodation of a standard by-pass valve or jumper lines.

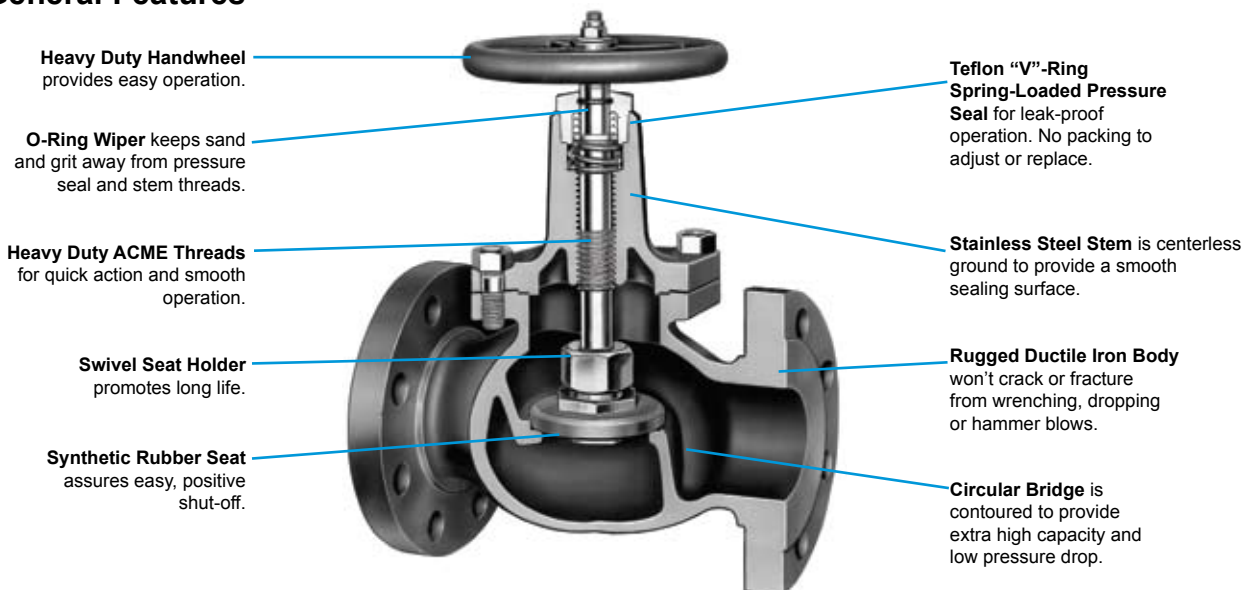
Hydrostatic Relief—When the design of the piping installation is such that liquid may be locked between two shut-off valves, a hydrostatic relief valve should be installed in the lines between the valves. The pressures which can develop due to temperature increase in a liquidfull line are tremendous 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 A7500 Series and TA7500 Series

Application

Specifically designed to assure positive shut-off and long, maintenancefree service life in liquid or vapor service on bulk storage containers, transports, bobtails, cylinder filling plants and plant piping.

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

Features

"V"-ring spring-loaded pressure stem seal provides for leak-proof operation. No packing to retighten or replace.

- Circular bridge in the globe design and a dropped seat in the angle design achieve greater flow with less pressure drop.
- Swivel seat disc assembly minimizes the seat disc from grinding on the body seat. The seat disc stops rotating as soon as it touches the body seat. This feature provides for good seat alignment and assures long seat life.
- 1/4" F. NPT plugged boss on the downstream side of the valve body allows attachment of a hydrostatic relief valve or vent valve.
- "V"-ring stem seal virtually eliminates hard to turn handles frequently encountered with packed type seals.
- Heavy duty rolled ACME stem threads provide quick action and long service life.

Materials

Body	Ductile Iron
Bonnet (7034, 7505-7508).....	Steel
Bonnet (7509-7518).....	Ductile Iron
Valve Stem	Stainless Steel
Wiper Ring.....	Synthetic Rubber
Seat Disc	See Ordering Chart
"V"-Rings	Teflon
Handwheel.....	Ductile Iron
Spring	Stainless Steel

Ordering Information

Part Number				Inlet and Outlet Connection	Port Diameter	Flow at 1 PSIG Pressure Drop (Cv) (GPM/ Propane)***		Accessories			
Buna N Seat Discs		Teflon Seat Discs*				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	-	TA7511FP	-	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	-	3" F. NPT	3⅝"	197.0	303.0				
A7517AP	A7518FP	TA7517FP	-	3" Flange**							

* Teflon seat discs on valves built to order.

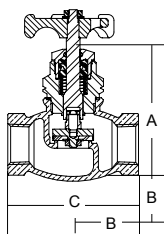
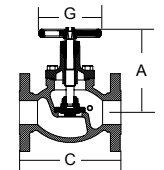
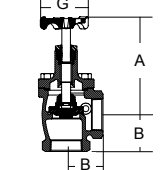
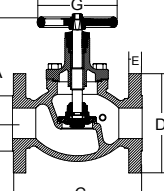
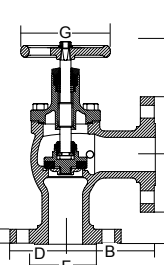
** 300# ANSI R.F. Flange.

*** 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.

E10

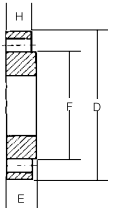







Globe and Angle Valve Dimensions

Drawing	Valve Number (A or TA Prefix)	Inlet & Outlet	Port Diameter	Dimensions						
				A	B	C	Flanges			G
							D	E	F	
	7034P	½" F. NPT	¾"	4¾"	-	3 ¹¹ / ₁₆ "	-	-	-	-
	7505AP	¾" F. NPT								
	7507AP	1" F. NPT	4 ⁵ / ₁₆ "							
	7034LP	½" F. NPT	1 ³ / ₄ "		-					
	7506AP	¾" F. NPT								
	7508AP	1" F. NPT								
	7509BP	1¼" F. NPT	1¼"	6¾"	-	4 ⁷ / ₈ "	-	-	-	-
	7511AP	1½" F. NPT	1½"	6 ¹³ / ₁₆ "		5 ³ / ₁₆ "				
	7513AP	2" F. NPT	2"	7 ³ / ₁₆ "		5 ⁷ / ₈ "				
	7517AP	3" F. NPT	3 ¹ / ₈ "	13¼"		9"				9"
	7510BP	1¼" F. NPT	1¼"	6¾"	2¼"	-	-	-	-	5¼"
	7512AP	1½" F. NPT	1½"	6 ¹³ / ₁₆ "	2 ⁷ / ₁₆ "					
	7514AP	2" F. NPT	2"	7 ³ / ₁₆ "	2 ¹¹ / ₁₆ "					
	7518AP	3" F. NPT	3 ¹ / ₈ "	11¾"	4"					9"
	7511FP	1½" Flange	1½"	7 ⁹ / ₁₆ "	-	7½"	6 ¹ / ₈ "	¾"	2 ⁷ / ₈ "	5¼"
	7513FP	2" Flange	2"	8 ⁷ / ₁₆ "		8½"	6 ¹ / ₂ "	1 ³ / ₁₆ "	3 ⁵ / ₈ "	
	7517FP	3" Flange	3 ¹ / ₈ "	13¼"		11 ¹ / ₈ "	8¼"	1 ¹ / ₈ "	5"	9"
	7514FP	2" Flange	2"	7½"	5¼"	-	6½"	1 ³ / ₁₆ "	3 ⁵ / ₈ "	5¼"
	7518FP	3" Flange	3 ¹ / ₈ "	11¾"	6¼"		8¼"	1 ¹ / ₈ "	5"	9"

NOTE: Regarding 7505AP through 7510BP — the thread used for assembling the bonnet to the body of the valve is a left hand thread. We advise our customers to be cognizant of this assembly design in attempting to remove the bonnets of these valves in order to avoid serious damage to the valves.

Flange Dimensions

	Valve Number (A or TA Prefix)	Size	Flange Drilling		D	E	F	H
	7511FP	1 1/2"		7/8" Bolt Holes on a 4 1/2" Bolt Circle Diameter	6 1/8"	13/16"	2 7/8"	3/4"
	7513FP	2"		3/4" Bolt Holes on a 5" Bolt Circle Diameter	6 1/2"	7/8"	3 5/8"	13/16"
	7514FP			3/4" Bolt Holes on a 5" Bolt Circle Diameter	6 1/2"	7/8"	3 5/8"	13/16"
	7517FP	3"		7/8" Bolt Holes on a 6 5/8" Bolt Circle Diameter	8 1/4"	1 1/8"	5"	1 1/16"
	7518FP			7/8" Bolt Holes on a 6 5/8" Bolt Circle Diameter	8 1/4"	1 1/8"	5"	1 1/16"

* Reducing screwed flanges are available for reducing 1 1/2" flange to 1 or 1 1/4" pipe thread and 3" flange to 2 1/2" pipe thread. Order from your local piping supplier.

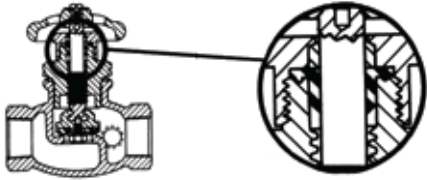
Flange Seal Globe and Angle Valves

General Information

Globe and Angle Valves, incorporating the synthetic rubber flange seal design, operate on the same principle as the "V"-ring valves. Gas pressure in the valve is exerted against the synthetic rubber flange, forcing it tightly against the stem.

Leak-tight performance is assured and periodic adjustment is not required. The synthetic rubber construction provides smooth operating performance with long service life.

These valves all incorporate a plugged $\frac{1}{4}$ " 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.

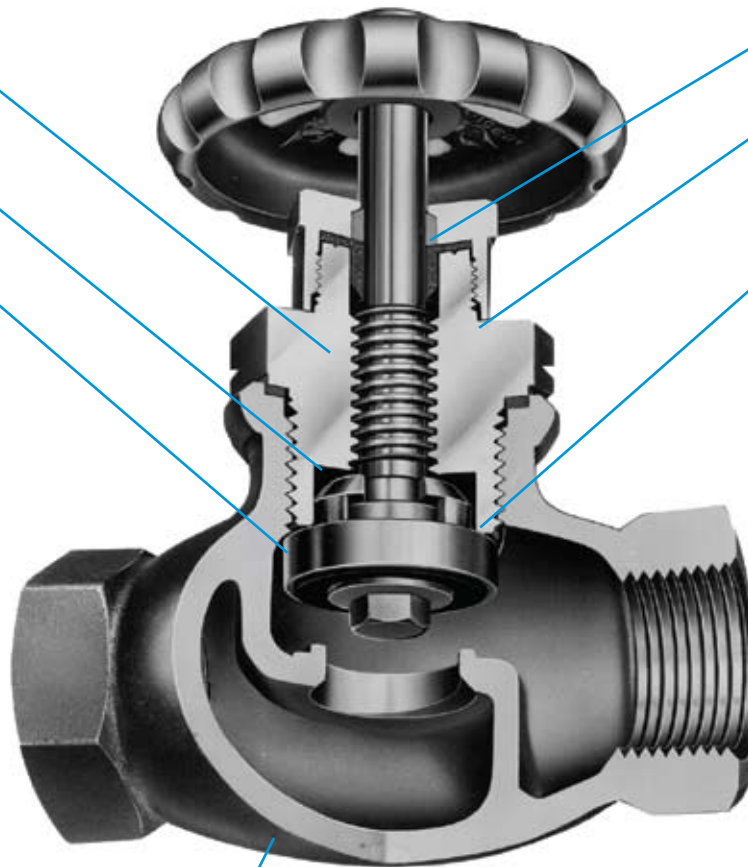
Swivel seat cannot grind during valve opening or closing.

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 7704, 7705 and 7706 Series

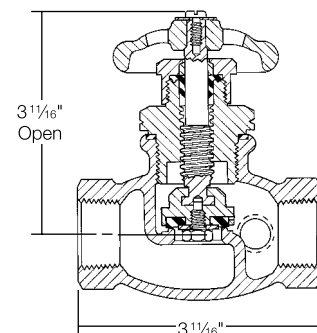
Application

Designed to assure positive shut-off and long maintenance-free service life in liquid or vapor service. Ideally suited for use on cylinder charging manifolds, truck filling hoses, bulk storage containers and plant piping.

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



A7704P



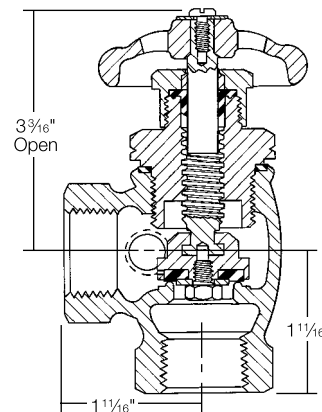
7704 P
A7704 P
7705 P
A7705 P

Features

- Available with either a brass bonnet and bronze stem for LP-Gas service or a steel bonnet and stainless steel stem for combined LP-Gas and anhydrous ammonia service.
- Flange seal stem provides for leak-proof operation. No packing to retighten or replace.
- Metal-to-metal back seat permits replacement of the flange ring with the valve in service.
- Plugged 1/4" NPT boss on downstream side of valve accommodates hydrostatic relief valve or vent valve.
- Swivel seat disc minimizes grinding on the body seat and assures longer service life.
- "Dropped seat" body design of the angle valve provides high flow capacity.



A7706 P



7704 LP
A7704 LP
7706 P
A7706 P

Materials

Body	Ductile Iron
Bonnet (7704, 05, 06).....	Brass
Bonnet (7704, 05, 06).....	Steel
Stem (7704, 05, 06).....	Bronze
Stem (7704, 05, 06).....	Stainless Steel
Flange Ring	Synthetic Rubber
Seat Disc	Synthetic Rubber



Ordering Information

Part Number		Inlet & Outlet Connection (F. NPT)	Flow at 1 PSIG Pressure Drop (Cv) (GPM/Propane)*		Accessories	
Globe	Angle		Globe	Angle	Hydrostatic Relief Valve	Vent Valve
7704P	7704LP	½"	7.3	12.3	SS8001J or SS8001L	TSS3169
A7704P	A7704LP					
7705P	7706P	¾"	11.5	17.7		
A7705P	A7706P					

* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: A7704LP @ 9 PSIG = $12.3 \times \sqrt{9} = 36.9$ GPM/propane. For NH₃ flow, multiply propane flow by .90.

Flange Seal Liquid Transfer Angle Valves for Bulk Storage Containers

7550 and 7551 Series

Application

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

In 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®.

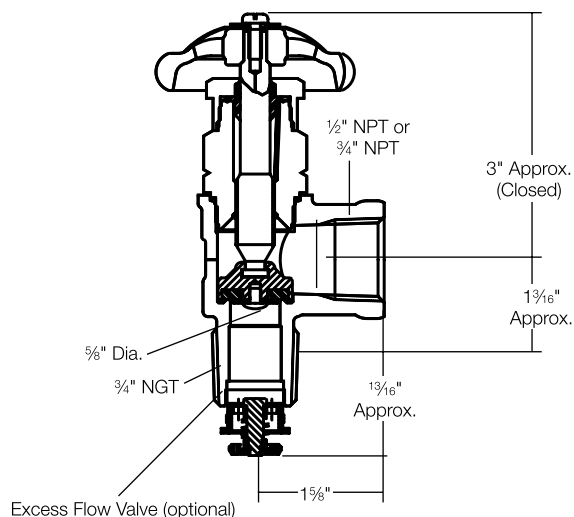
When equipped with an integral excess flow valve (7550PX), the valve should be mounted in a forged steel 3000 lb. half coupling. When mounted in a 1 1/4" x 3/4" NPT reducing coupling, the 3/4" female thread in this coupling must be full length — equivalent to a forged steel 3000 lb. half coupling.

The excess flow valve will not function properly if these specifications are not met. Refer to the Warning Bulletin in the Excess Flow Valve Section of this catalog.



Features

- Flange seal stem design provides for leak-proof operation. No packing to retighten or replace.
- Large, unrestricted interior ports reduce pressure drop through the valve, increasing capacity and preventing cavitation.
- Resilient swivel seat disc assures longer seat life and easy, positive shut-off.
- Plugged 1/4" NPT outlet boss accommodates hydrostatic relief valve or vent valve.
- Specifically designed for liquid transfer of LP-Gas with the Chek-Lok®.



Materials

Body (7750, 51).....	Brass
Body (A7750, 51).....	Cadmium Plated Ductile Iron
Bonnet (7750, 51).....	Brass
Body (A7750, 51).....	Steel
Stem (7750, 51).....	Bronze
Stem (A7750, 51).....	Stainless Steel
Flange Ring	Synthetic Rubber
Seat Disc	Synthetic Rubber



Ordering Information

Part Number	Inlet Connection (F. 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			No	13.3	-	SS8001J	TSS3169
7550PX		3/4"	Yes	-	16.0	3127U	3165
A7550PX			Yes	-	16.0	SS8001J	TSS3169
7551P	1/2"	1/2"	No	8.9	-	3127U	3165
A7551P			No	8.9	-	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, multiple propane flow by .90.

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

Tank Car Angle Valves for Railroad Tank Cars TA7894P

Application

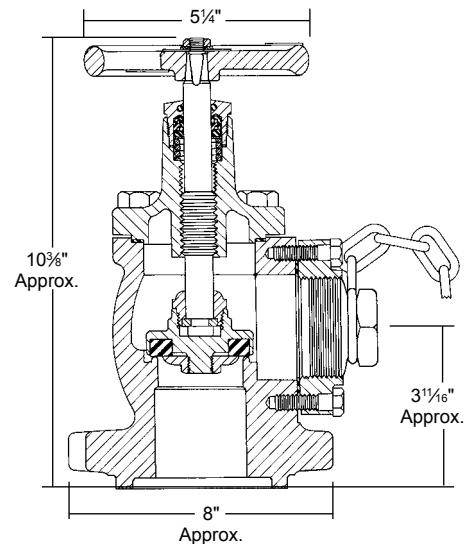
Designed especially for transfer of LP-Gas and anhydrous ammonia in railroad tank car service.

The combined heavyweight ductile iron castings and precision machining provide ruggedness and superior performance in working pressures up to 400 PSIG.

Features

- "V"-ring spring-loaded pressure seal design provides dependable, leak-free operation. No packing to retighten or replace.
- Wiper o-ring eliminates entrance of dirt and grit into stem area that can prohibit smooth operation.
- Heavy duty ACME stem threads give quick action and are hardened for long service life.
- Swivel seat reduces scoring of seat disc and provides positive shut-off.
- Full diameter seat provides greater flow capacity and low pressure drop.
- Plugged 1/4" NPT boss on downstream side of valve accommodates vent valve or hydrostatic relief valve.
- Equipped with a malleable iron plug and chain installed in the valve outlet.

AAR Approval #E-049015



Materials

Body	Ductile Iron
"V"-Rings	Teflon
O-Ring	Synthetic Rubber
Stem	Stainless Steel
Bonnet	Ductile Iron
Seat Disc	Teflon
Handwheel.....	Cadmium Plated Ductile Iron



Ordering Information

Part Number	Inlet Connection	Outlet Connection (F.NPT)	Flow At 1 PSIG (Cv) Pressure Drop	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.

E15

Multipurpose Valve for Filling of NH₃ Containers A8016DBC

Application

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

Features

- Positive seating back check valve opens for maximum flow at minimum pressure drop when filling — regardless of the type of coupling in which the valve is installed.
- Back Check seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring-loaded stem seal design requires no repacking or field adjustment.
- Specially machined break-away groove beneath ACME threads will shear-off with excessive pull on the hose and leave the valve body intact.
- Plugged 1/4" NPT boss accommodates vent valve or hydrostatic relief valve.

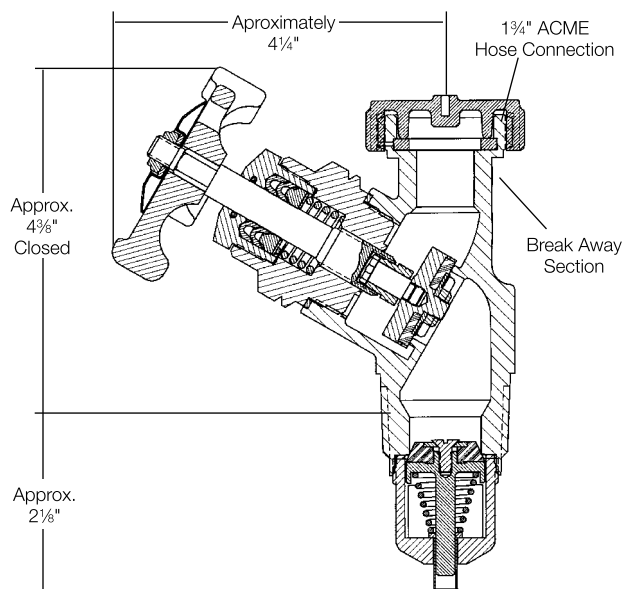


A8016DBC



Materials

Body	Ductile Iron
Bonnet	Steel
"V"-Rings	Teflon
Stem	Stainless Steel
Seat Disc	Resilient Synthetic Rubber
Back Check Valve.....	Stainless Steel, Steel and Synthetic Rubber
Springs	Stainless Steel



Ordering Information

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

* Determined at 9.5 to 12 PSIG differential.

** Determined at 100 PSIG inlet.

Multipurpose Valve for Filling of NH₃ Containers A8016DP

Application

Designed specifically for use as a manual valve or vapor equalizing valve on anhydrous ammonia applicator and nurse tanks.

This valve incorporates an integral excess flow valve. When product is required, the valve must completely open and backseated to allow the excess flow valve to function properly as explained in the excess flow section of this catalog.

Features

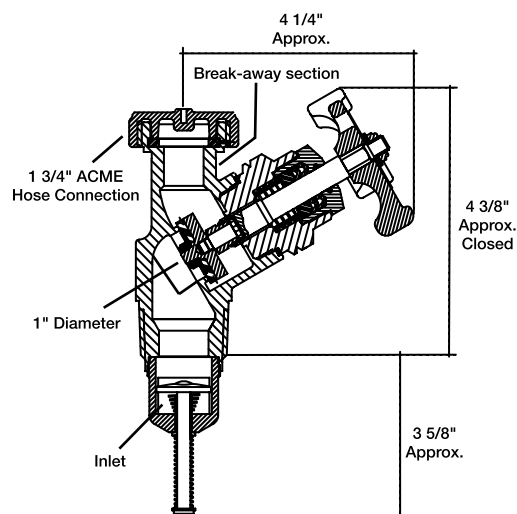
- Positive-acting excess flow valve opens for maximum flow at minimum pressure drop when filling -- regardless of the type of coupling in which the valve is installed.
- Excess flow seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring-loaded stem seal design requires no repacking or field adjustment.
- Specially machined break-away groove beneath ACME threads will shear-off with excessive pull on the hose and leave the valve body intact.
- Plugged 1/4" NPT boss accommodates vent valve or hydrostatic relief valve.



A8016DP

Materials

Body	Ductile Iron
Bonnet	Steel
"V"-Rings	Teflon
Stem	Stainless Steel
Seat Disc	Resilient Synthetic Rubber
Excess Flow Valve	Stainless Steel--Steel Body
Springs	Stainless Steel



Ordering Information

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 3/4"	95	44	24,000	SS8001J	TSS3169

* Determined at 9.5 to 12 PSIG differential.

** Determined at 100 PSIG inlet.

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

A8017D & A8020D

Application

Designed especially for use as a high capacity liquid withdrawal valve on LP-Gas and anhydrous ammonia containers.

These valves incorporate an integral excess flow valve. When product is required, the valve must be completely open and backseated to allow the excess flow valve to function properly as explained in the excess flow valve section of this catalog.

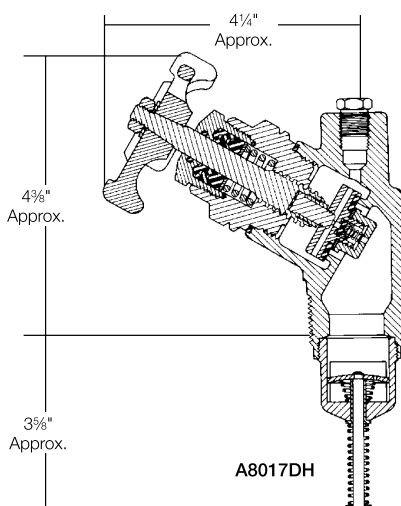
The A8017DH is equipped with a soft seated automatic differential back pressure check valve in the seat disc assembly. This allows any pressure build up in the liquid transfer line in excess of 10-15 psig above the container pressure to flow back into the container. The transfer hose is protected against excessive liquid or vapor pressure entrapment, which adds materially to the useful life of flexible hose. In addition to increasing hose service life, the equalizing valve adds substantially to the operating safety of liquid transfer systems.

Features

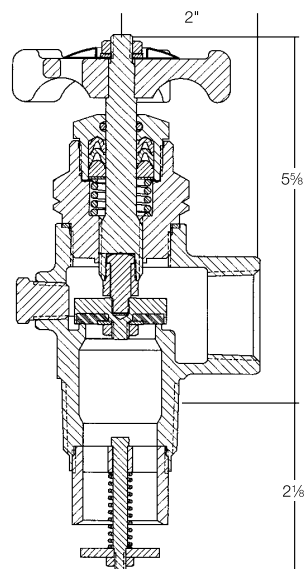
- Positive-acting excess flow valve opens for maximum flow at minimum pressure drop when filling — regardless of the type of coupling in which the valve is installed.
- Excess flow seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring loaded stem seal design requires no repacking or field adjustment.
- A8017DH has two plugged 1/4" NPT ports, one on the top and the other on the side, accommodate either a vent valve or hydrostatic relief valve.
- A8020D has a plugged 1/4" NPT port that accommodates vent valve, hydrostatic relief valve, or pressure gauge.
- A8017DH incorporates an automatic back check valve built into the shut-off valve, eliminating the need for a separate hydrostatic relief valve.

Materials

Body	Ductile Iron
Bonnet	Steel
Stem	Stainless Steel
Seat Disc	Resilient Synthetic Rubber
"V"-Rings	Teflon
Excess Flow Valve.....	Stainless Steel - Steel Body
Springs	Stainless Steel



A8017DP



A8020D



Ordering Information

Part Number	Inlet Connection (M. NPT)	Outlet Connection (F. NPT)	Approximate Excess Flow Liquid Closing Flow** (GPM/Propane)	Accessories	
				Hydrostatic Relief Valve	Vent Valve
A8017DH	1¼"	1"	49	Not Required	TSS3169
A8017DP			55	SS8001J	
A8017DLP		¾"	49		
A8020D	1¼"	1"	78	SS8001J	TSS3169

* 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 A8018DP

Application

Designed primarily for use as a combination filler and liquid withdrawal valve on three-opening applicator tanks or on nurse tanks.

This valve incorporates an integral excess flow valve. When product is required, the valve must be completely open and backseated to allow the excess flow valve to function properly as explained in the excess flow valve section of this catalog.

Features

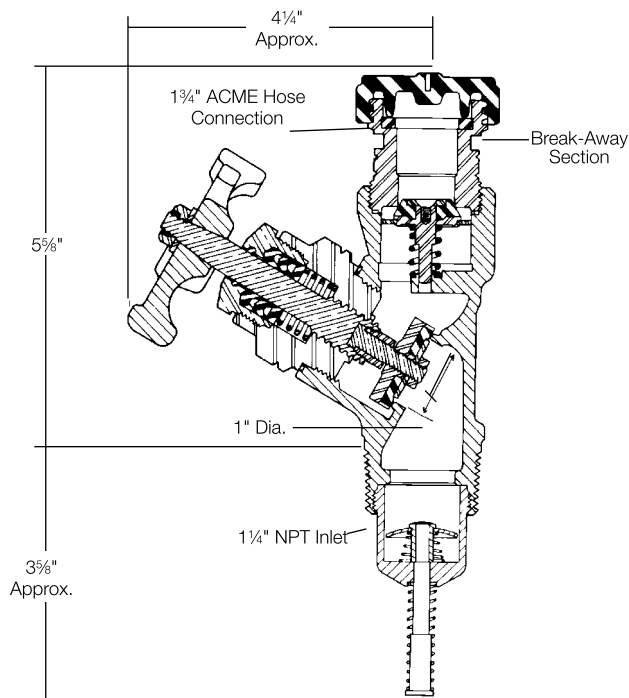
- Functions as both a filler valve and liquid transfer valve, in one unit.
- Positive acting excess flow valve opens for maximum flow at minimum pressure drop when filling — regardless of the type of coupling in which the valve is installed.
- Excess flow seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Specially machined break-away groove beneath ACME thread of filler valve will shear-off with excessive pull on the hose and leave the valve body intact.
- Triple guide filler valve check provides for dependable shut-off performance when filling ceases.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring loaded stem seal design requires no repacking or field adjustment.
- Plugged 1/4" NPT boss accommodates vent valve or hydrostatic relief valve.

Materials

Body	Ductile Iron
Bonnet	Steel
Stem	Stainless Steel
Seat Discs	Synthetic Resilient Rubber
"V"-Rings	Teflon
Excess Flow Valve	Stainless Steel - Steel Body
Springs	Stainless Steel



A8018DP



Ordering Information

Part Number	Inlet Connection (M. NPT)	Outlet Connection (F. NPT)	Filling Connection (M.ACME)	Filling Capacity At 20 PSIG Pressure Drop GPM/NH ₃	Approximate Excess Flow Liquid Closing Flow GPM/NH ₃	Accessories	
						Hydrostatic Relief Valve	Vent Valve
A8018DP	1 1/4"	1"	1 1/4"	74	50	SS8001J	TSS3169

* Determined at 9 to 12 PSIG differential.

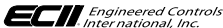
Warning Notice

The following warning information, Part Number 903-500, is included with each shipment of Quick-Acting and Tank Car Valves to the first purchaser of the product from the factory.

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

DANGER
LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE
AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS ...EVACUATE AREA IMMEDIATELY! CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.
Make sure you are thoroughly trained before you attempt any valve installation, maintenance, or repair. Improper conditions or procedures can cause accidents resulting in property damage and personal injury. Become thoroughly familiar with NFPA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII Safety Warnings WB-2 "LP-Gas Cylinder Valves", WB-3 "LP-Gas Excess Flow Valves", and WB-4 "LP-Gas Filler Valves and Hose End Filling Valves." Follow their recommendations. Know and understand NFPA Pamphlet 58 "Storage and Handling Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures." Make sure this valve is the proper one for this installation. Avoid misusing LP-Gas equipment. Apply thread compound compatible with LP-Gas on valve external threads only. Make sure compound never comes into contact with other parts of the valve. Install valves by applying force to wrenching flats only. Tighten pipe threads approximately 1 to 1 1/2 turns beyond the hand-tight insertion point using a wrench which avoids damage to other valve parts. Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material. Check container-valve connection with a non-corrosive leak detection solution before filling with LP-Gas. Purge container before filling with LP-Gas (refer to the ECII LP-Gas Serviceman's Manual for recommended procedure). Test excess flow check valve for proper operation before placing into service. See NFPA Bulletin 113-78 for recommended procedure. Check outlet connection make-up for leaks with a non-corrosive leak detection solution when placing into service. If container is not being placed into service at the present time, insert a plug or cap onto the outlet connection. In selecting a label for posting at the installation site, consider ECII 903-400 or 901-400 along with your own, NFPA's and others. Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment. Engineered Controls International, Inc., ECII requests that this information be forwarded to your customers. Additional copies are available from ECII and your Authorized Product Distributor.

READ THIS FIRST
WARNING



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Warning 903-500

Cross Reference by Part Number

TA7034LP.....E10	TA7511AP.....E10	TA7517AP.....E10	A7704LP.....E13
7034LP.....E11	7511AP.....E11	7517AP.....E11	7704LP.....E13
TA7034P.....E10	A7511FP.....E10	TA7517FP.....E10	A7704P.....E13
7034P.....E11	TA7511FP.....E10	7517FP.....E11	7704P.....E13
7053T.....E8	7511FP.....E11	7517FP.....E11	A7705P.....E13
A7505AP.....E10	7511FP.....E11	A7518AP.....E10	7705P.....E13
TA7505AP.....E10	A7512AP.....E10	TA7518AP.....E10	A7706P.....E13
7505AP.....E11	TA7512AP.....E10	7518AP.....E11	7706P.....E13
A7506AP.....E10	7512AP.....E11	A7518FP.....E10	A7707L.....E6
TA7506AP.....E10	A7513AP.....E10	7518FP.....E11	A7708L.....E6
7506AP.....E11	TA7513AP.....E10	7518FP.....E11	A7793A.....E5
A7507AP.....E10	7513AP.....E11	A7550P.....E14	A7797A.....E5
TA7507AP.....E10	A7513FP.....E10	7550P.....E14	TA7894P.....E15
7507AP.....E11	TA7513FP.....E10	A7550PX.....E14	7901T.....E8
A7508AP.....E10	7513FP.....E11	7550PX.....E14	7901TA.....E8
7508AP.....E11	7513FP.....E11	A7551P.....E14	7901TB.....E8
A7509BP.....E10	A7514AP.....E10	7551P.....E14	7901TC.....E8
TA7509BP.....E10	7514AP.....E11	A7553A.....E8	A8016DBC.....E16
7509BP.....E11	A7514FP.....E10	7554LAV.....E7	A8016DP.....E17
A7510BP.....E10	7514FP.....E11	7554LV.....E7	A8017DH.....E18
TA7510BP.....E10	7514FP.....E11	7554SAV.....E7	A8017DLP.....E18
7510BP.....E11	A7517AP.....E10	7554SV.....E7	A8017DP.....E18
A7511AP.....E10	A7517AP.....E10	TA7614FP.....E10	A8018DP.....E19
			A8020D.....E18