

LP-Gas Emergency Shut-Off Valves (ESV's)

Why and how they should be used for Bobtail Filling and Transport Unloading.

General Information

The primary purpose of Emergency Shut-Off Valves in bobtail filling and transport unloading is to allow quick shut-off of liquid and vapor flow in the event there is an accidental pull-away of a truck or a hose rupture, both of which could cause a fire.

A system using Emergency Shut-Off Valves will not prevent some spillage of liquid and vapor, but the total system should be constructed so this spillage will be kept to a minimum.

This can be accomplished either by making possible, quick action by the driver or plant personnel in closing the valves by manual remote or pneumatic remote actuation; or in case of a pull-away, by automatic closing of the liquid valve by means of a cable connected to the liquid hose.

By minimizing the presence of liquid and vapor, the chance of a fire or explosion will be reduced. In case of a fire, thermal links at the valves or at other appropriate locations could close the valves and prevent further release of liquid and vapor.

The valve closing systems will be discussed later in this section. The user should decide which system is most appropriate, depending on the piping configuration and the general layout of the filling/unloading area.

ESV Application for Bobtail Loading and Transport Unloading

A very important function of the typical LP-Gas storage plant is to transfer LP-Gas into bobtails for delivery to customers. How efficiently and rapidly these bobtails can be filled often determines the number of customers that can be served each day, as well as how many bobtails are required to satisfactorily serve all customers. Therefore, the selection of an ESV for the bobtail liquid loading line should be done with care so as to maximize efficiency in filling and have year-round dependability.

The RegO 2" (A6016) and 3" (A6024) liquid ESVs have a full open port so that the restrictions of flow would be no more than you would expect through an equivalent length of schedule 80 pipe. To improve the overall efficiency of the system, the valves were designed as an operating valve so it could replace an existing globe or angle valve already installed at the end of the fixed piping. Thus, installing a RegO ESV could actually result in a more efficient pumping operation than the existing system.

Equally important in the consideration of an ESV is its performance in an emergency, especially bobtail pull-aways. Therefore, when selecting the proper ESV for bobtail filling, also consider the dependability of performance, and simplicity of operation and maintenance.

The RegO ESVs clearly indicate to the operator its open or closed position. It allows full manual control by the operator and provides means for remote operation in emergencies from either in front of the valve or in the rear.

No complicated systems of pulleys and cables are necessary since direct, straight pulls will close the valve. Means are even provided to secure a length of cable to the transfer hose so as to produce an automatic closing in the event the driver pulls away without disconnecting the hose.

NFPA Provisions (2014)

The pertinent provisions of NFPA Pamphlet 58, as they apply to Emergency Shut-Off Valves and how they are to be installed are below (for complete information refer to NFPA 58):

Section 5.12.2.3 requires that emergency shutoff valves be approved and incorporate all the following means of closing: (1) Automatic shutoff through thermal (fire) actuation, (2) Manual shutoff from a remote location, (3) Manual shutoff at the installed location.

Section 5.12.2.4 states where fusible elements are used; the melting point cannot exceed 250°F (121°C).

This provision sets for the basic criteria for the emergency shutoff valve, a key valve in the protection of many liquid transfer operations. Actuating means for remote control may be electrical, mechanical or pneumatic.

Many systems use a pneumatic system where the tubing itself acts as a fusible element releasing the pressure holding the valve open. With respect to the feature of manual shutoff at the installed location, it is recommended that this valve be operated occasionally. Also, the system should be tested periodically to determine that it will function properly.

Section 6.12.1 covers new and existing installations, stationary container storage systems with an aggregate water capacity of more than 4000 gal (15.1m³) utilizing a liquid transfer line that is 1-1/2 in. (39 mm) or larger and pressure equalizing lines 1-1/4 in (32 mm) or larger, must be equipped with emergency shutoff valves.

Section 6.12.2 describes where an emergency shutoff valve must be installed in the transfer lines of the fixed piping transfer system within 20 ft (6m) of lineal pipe from the nearest end of the hose or swivel-type piping connections.

Section 6.12.5 covers installations where there are two or more liquid or vapor lines with hoses or swivel-type piping connected of the sizes designated in 6.12.1, an emergency shutoff valve or a backflow check valve, where allowed, must be installed in each leg of the piping.

Section 6.12.6 states the requirements for thermal protection; emergency shutoff valves must be installed so that the temperature-sensitive element in the valve, or a supplemental temperature-sensitive element that operates at a maximum temperature of 250°F (121°C) that is connected to actuate the valve. It also states maximum distance this can be which is not more than 5ft (1.5m) from the nearest end of the hose or swivel-type piping connected to the line in which the valve is installed.

Section 6.12.7 requires that the temperature-sensitive elements of emergency shutoff valves cannot be painted, or can they have any ornamental finishes applied after manufacture.

Section 6.12.8 emergency shutoff valves or backflow check valves must be installed in the fixed piping in manner to protect them so that any breaks resulting from a pull will occur on the hose or swivel-type piping side of the connection; allowing the valves and piping on the plant side of the connection to remain intact.

Section 6.12.9 emergency shutoff valves that are required to be installed in accordance with 6.12.2, that a means must be incorporated to actuate the emergency shutoff valves in the event of a break of the fixed piping resulting from pulling of the hose.

Section 6.12.10 states that all emergency shutoff valves required by the code be annually tested for the functions required in 5.12.2.3 (2) Manual shutoff from a remote location, (3) Manual shutoff at the installed location; the results of the test are documented.

Section 6.12.12 requires that new and existing emergency shutoff valves shall comply with 6.12.12.1 through 6.12.12.3 below.

Section 6.12.12.1 requires that the emergency shutoff valve shall have at least one clearly identified and accessible manually operated remote shutoff device.

Section 6.12.12.2 states that the remote shutoff device for an emergency shutoff valve must be located not less than 25ft (7.6m) or more than 100 ft. (30 m) in the path away from the emergency shutoff valve.

Section 6.12.12.3 describes the requirements when an emergency shutoff valve is used in place of an internal valve in compliance with 5.7.4.2(D) (2) the remote shutoff device have to be installed in accordance with 6.11.4 and 6.11.5.

The provisions above and others covered in NFPA 58 can assist in determining how bobtail filling and transport unloading stations are to be configured. The diagrams shown here offer general information, they should not be used as an installation guide.

LP-Gas Emergency Shut-Off Valves (ESV's)

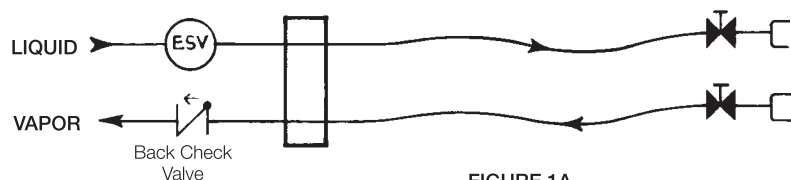


FIGURE 1A
Bobtail Filling Only

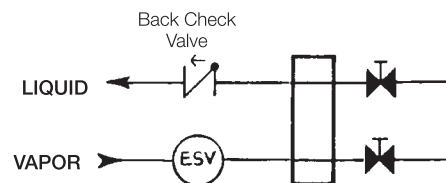


FIGURE 1B
Transport Unloading Only

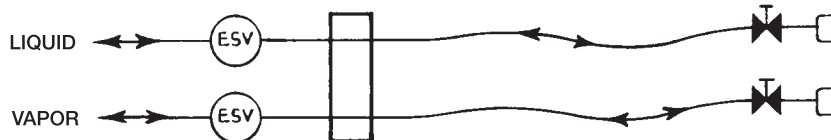


FIGURE 1C
Combined Bobtail Filling
and Transport Unloading

Installation Compliance with NFPA Requirements

A valve that is approved as an ESV may be installed in the fixed piping up to a distance of 20 feet (along the pipe) from the point where the transfer hose is attached to the fixed piping.

However, when the ESV is located more than five feet from the end of the fixed piping, an additional fusible element must be installed within five feet of the point of attachment of the hose, and be connected to the ESV valve in such a manner that it will cause the ESV to close in the event of a fire.

The ideal location of the ESV is as close to the end of the fixed piping as possible. This position eliminates the need for an additional fusible element and cable, and it may also permit the elimination of a restrictive valve already installed at the end of the fixed piping.

To this point, our comments have been principally concerned with ESV protection of the liquid line at bulk plants because this is the area of greatest potential danger in the event of a pull-away or hose rupture.

However, regulations also require an ESV in the vapor transfer line when the vapor hose is 1-1/4" or larger. A helpful rule of thumb in determining whether or not an ESV control valve is required in your

vapor system is this: If the vapor flow is out of the storage tank, an ESV is required. ESV systems are designed to protect the storage tank contents against uncontrolled release.

Therefore, a bobtail loading system could use a 1-1/4" or larger back pressure check valve in the vapor system since the flow of vapor is always from the bobtail being filled back to the storage tank. To improve transfer rates, the use of the RegO 6586D back check valve at this location would provide protection at minimum pressure drop.

If the bobtail vapor line is also used when unloading transports, then the RegO A6010 ESV should be used. The A6010 provides thermal protection, manual closing and a remote emergency closing system similar to the RegO 2" liquid ESV, A6016.

Remote Control Systems

Usually in transfer loading operations, the valve handles and cables are located in close proximity to the area of greatest potential danger during an emergency. Therefore, each bobtail filling system or transport unloading system should have installed in it at least one readily accessible, alternate remote operating device.

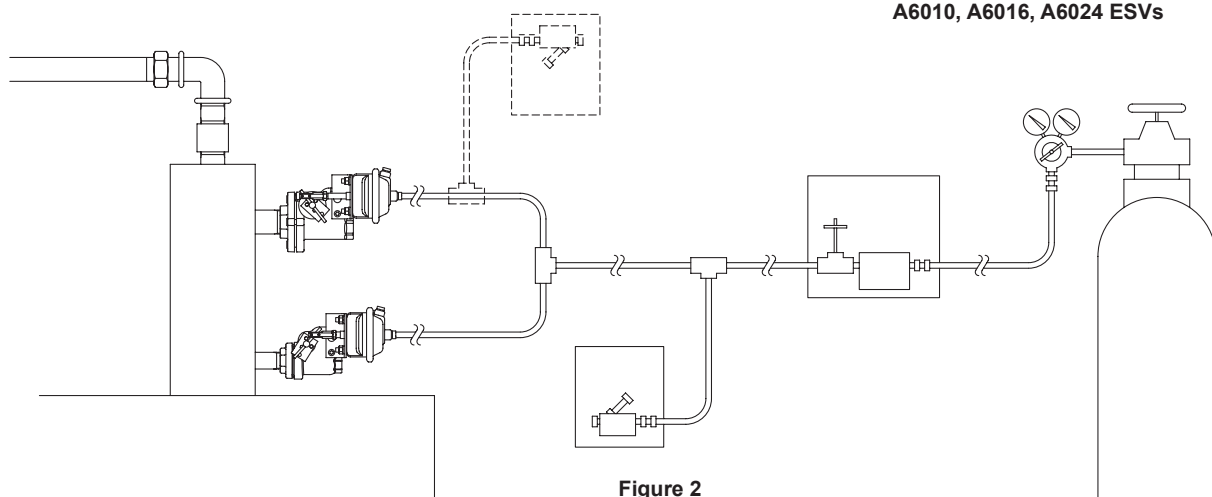


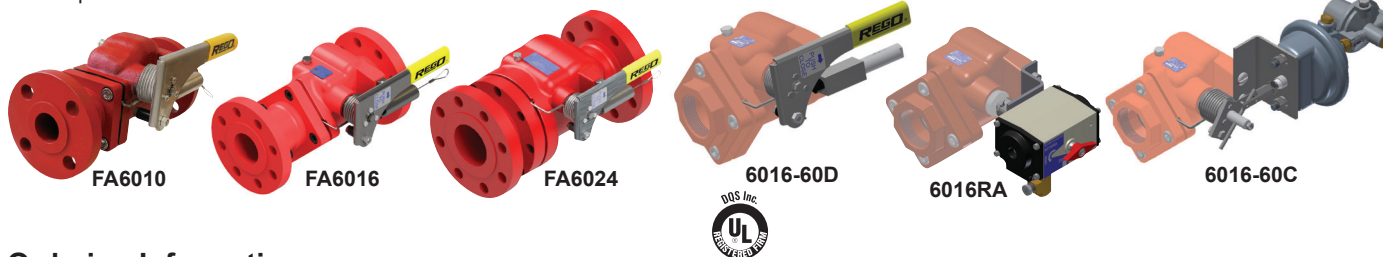
Figure 2
RegO ESV's with Remote Pneumatic
and Transfer Hose Cable Release
Systems Typical Installation

A6010, A6016, A6024 ESVs

Swing-Check ESVs for Bulk Plants

A6010, A6016, and A6024 Series

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, line break, or hose rupture.



Ordering Information

Part #	Seat	Inlet and Outlet Connections	Liquid Flow Capacity at 10 PSIG Drop (GPM)	Accessories			
				Remote Close Pneumatic	Remote Open/Close Pneumatic	Remote Open/Close Rotary	
VA6010	Viton	1-1/4" F. NPT	259 (LP-Gas) 233 (NH3)	6016--60D	6016-60C	6016RA	
A6010	Buna-N	1-1/4" F. NPT					
VA6016	Viton	2" F.NPT	711 (LP-Gas) 640 (NH3)				
A6016	Buna-N	2" F.NPT					
VA6024	Viton	3" F.NPT	1325 (LP-Gas) 1173 (NH3)				
A6024	Buna-N	3" F.NPT					
Flanged							
FVA6010	Viton	1-1/4" - 300# ANSI RF Flange	259 (LP-Gas) 233 (NH3)	FA6016-60D	*	6016RA	
FA6010	Buna-N	1-1/4" - 300# ANSI RF Flange			6016-60C		
FVA6016	Viton	2" - 300# ANSI RF Flange	711 (LP-Gas) 640 (NH3)				
FA6016	Buna-N	2" - 300# ANSI RF Flange					
FVA6024	Viton	3" - 300# ANSI RF Flange	1325 (LP-Gas) 1173 (NH3)				
FA6024	Buna-N	3" - 300# ANSI RF Flange					

* Not Available

Swing-Check ESVs for Bulk Plants with Electric Actuator

EA6010, EA6016 and EA6024 Series

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, line break, or hose rupture.



Ordering Information

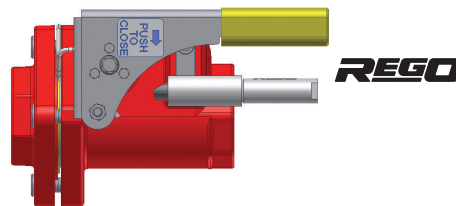
Part #	Seat*	Inlet and Outlet Connections	Liquid Flow Capacity at 10 PSIG Drop (GPM)	Voltages
EA6010	Buna-N	1-1/4" F.NPT	259 (LP-Gas) 233 (NH3)	12/24 VDC
EA6016	Buna-N	2" F.NPT	711 (LP-Gas) 640 (NH3)	
EA6024	Buna-N	3" F.NPT	1325 (LP-Gas) 1173 (NH3)	
Flanged				
EFA6010	Buna-N	1-1/4" - 300# ANSI RF Flange	259 (LP-Gas) 233 (NH3)	12/24 VDC
EFA6016	Buna-N	2" - 300# ANSI RF Flange	711 (LP-Gas) 640 (NH3)	
EFA6024	Buna-N	3" - 300# ANSI RF Flange	1325 (LP-Gas) 1173 (NH3)	

* Viton seat available on request.

ESV Pneumatic Controls

RegO Emergency Shut-Off Valves modified for remote pneumatic shutdown operation retain all the operating features of the standard valves.

Once equipped with pneumatic cylinders and then pressurized, the pneumatic cylinder piston rod disengages from a striker plate, allowing the ESV to be manually opened and the striker plate to act as a latch and hold the valve open. Release of the control system pressure for any reason closes the ESV for fail-safe operation.



A6016 with 6016-60D Remote Close Actuator

6016PN-50 Pneumatic Remote Control Kit

Control kit with components for connecting and charging the pneumatic controls from a source of compressed gas (air or nitrogen) to a RegO liquid or vapor ESV. Includes charging valves with low pressure indicator, operating valves, 100 feet of 1/4" plastic tubing and tube fittings.



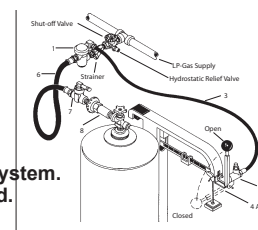
Ordering Information

Part #	Description
6016-60D	Cylinder assembly kit to convert 6016 ESVs to pneumatic shutdown.
6016PN-50	Pneumatic remote shutdown system kit, complete with 100' of tubing, fittings, 1 charging valve assembly and 1 remote shutdown valve assembly
6016PN-80	Bypass kit for pneumatic actuators.
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.
7606RM	Remote Close Cable Kit

Hydraulic Automatic Cylinder Filling System

7194MD and 7194HD

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.



Hydraulic self-contained system.
No external power required.

Hydraulic System Components

Ordering Information

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	1/2" NPT Female, with 1/8" NPT Female Hydraulic Connection	7177
2	Master Cylinder, with Actuator Lever	1/8" NPT Hydraulic Connection	7188
3	Hydraulic Hose Assembly	3/16" I.D. with 1/8" NPT Male Ends, 43-1/2" 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-3A
4B	Bracket Kit for Howe Scales, Complete with Screws, Washers, Nuts and Instructions	-	7194H-3
5	Can of Hydraulic Fluid, Complete with Filling Spout	1-1/2 ounce	7188-21
6	Propane Filling Hose Assembly	1/2" I.D., with 1/2" NPT Male Ends. 50-1/2" Overall Length	7193D
7	Quick-acting Shut Off Valve	1/2" NPT Inlet X 1/4" NPT Outlet	7901TB
8*	Soft Nose Cylinder Connector	1/4" NPT Male X POL Male	7193D-10L