SQUIBB TAYLOR INCORPORATED

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Excess Flow Valve Bulletin

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WARNING

Excess Flow valves are a Safety Device which are designed to close in the event of a hose or piping failure i.e., a pull-away or incident which causes the hose or piping to be Severed Completely. It is of utmost importance that these valves be Installed and Operated Properly in order to provide the Safety Protection for which they were designed. The following conditions must be met for any Excess Flow Valve to perform properly.

This bulletin applies to Squibb-Taylor valves only. If you have something other than a Squibb-Taylor product, you will need to contact the distributor or manufacturer for their recommendation.

This Section Covers Valve Models A1587, A1590, A1592, A1596, A1597, A1598, AL477, AL478 and AL479. These Valves Are Used Primarily In Dip Tubes and Risers Where The Excess Flow Valve Is An Integral Part Of A Withdrawal Or Fill Type Shut Off Valve.

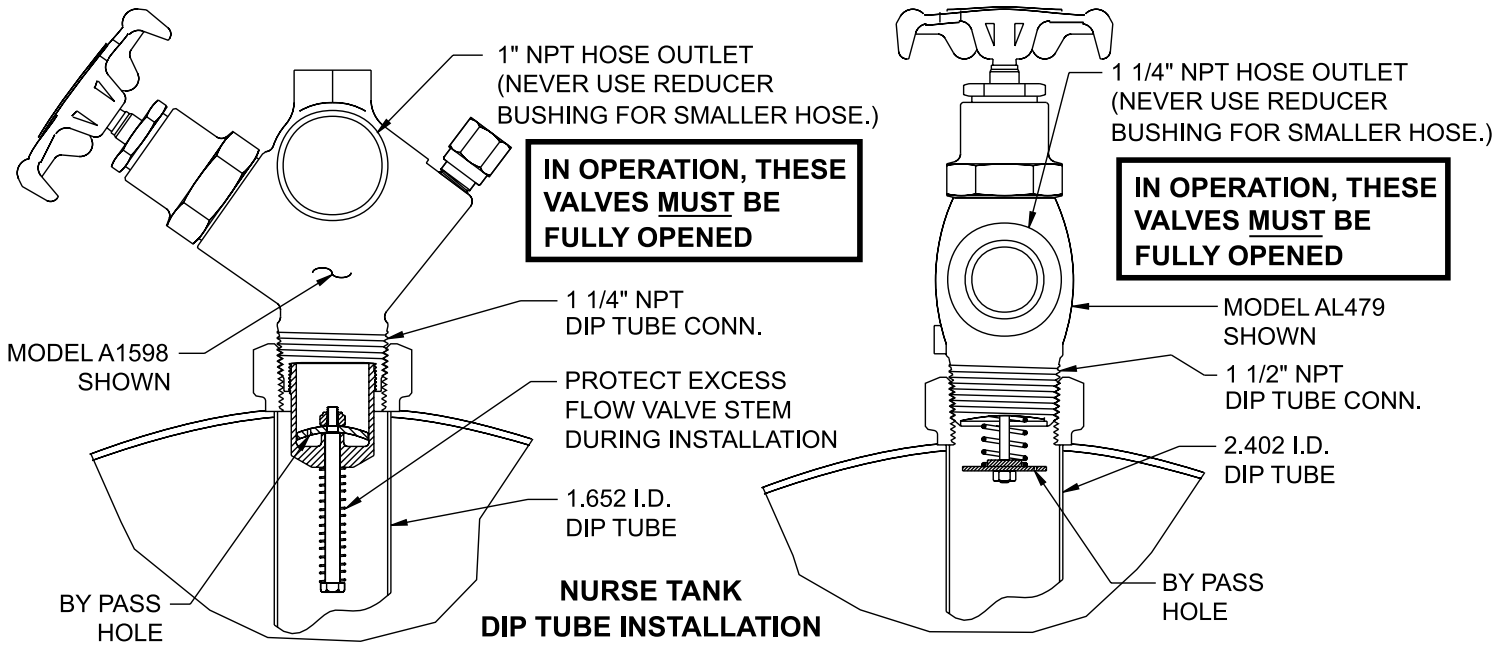
Valve Model AL487 Is A Tank Withdrawal Valve Designed For Mounting Exclusively In A Tank Bottom And Should Not Be Mounted In A Dip Tube.

A. PROPER INSTALLATION PROCEDURE

1. Dip Tubes - A 1.652" ± .015 inside diameter dip tube with a 1-1/4" NPT connection must be used to obtain the proper filling, withdrawal, and closing flow rates for any valve that has a 1" NPT hose at the outlet. All valves with 1" NPT hose outlet connections have a 1-1/4" NPT inlet connection.

   A 2.402" ± .015 inside diameter dip tube with a 1-1/2" NPT connection must be used for any valve that has a 1-1/4" NPT hose at the outlet. All valves with 1-1/4" NPT hose outlet connections have a 1-1/2" NPT inlet connection.

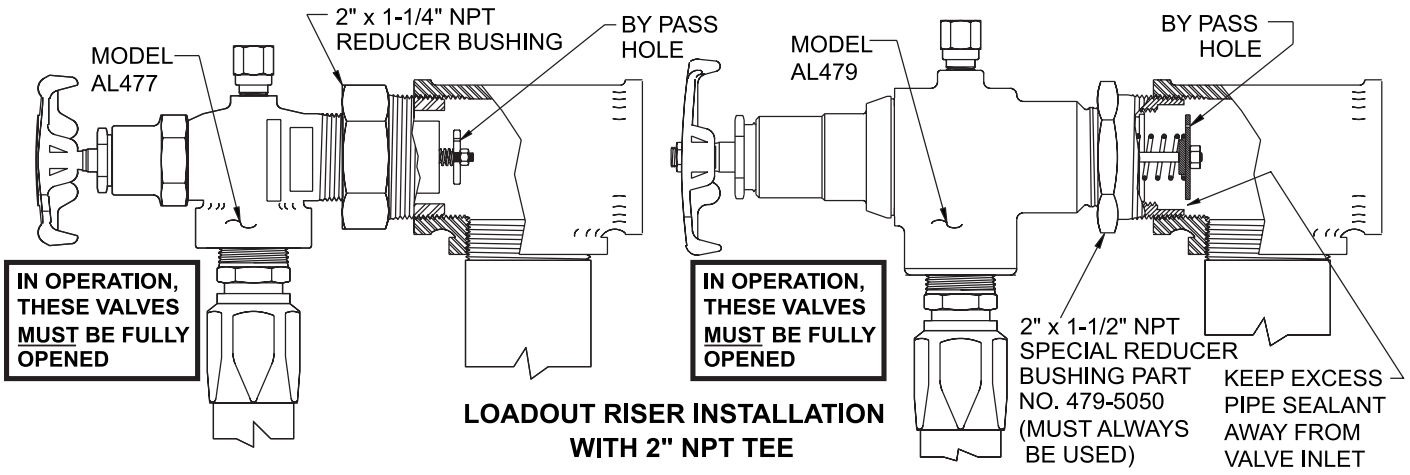
   NOTE: A dip tube that is too small will cause the valve to shut prematurely, even when slowly opening the valve. A dip tube that is too large will not create the proper force on the spring actuated check disc, and the valve may never close, in the event of a hose failure.



NURSE TANK DIP TUBE INSTALLATION

2. Riser Installations—— Liquid withdrawal from a 2" Tee in loadout risers is a common application for Models AL477 and AL479 valves.

NOTE: When using the Model AL479 valve a special bushing, (Part Number 479-5050), must be used to provide the proper closing rate should a total hose failure occur. When installing valves keep thread sealing compounds away from Excess Flow Valve seats.

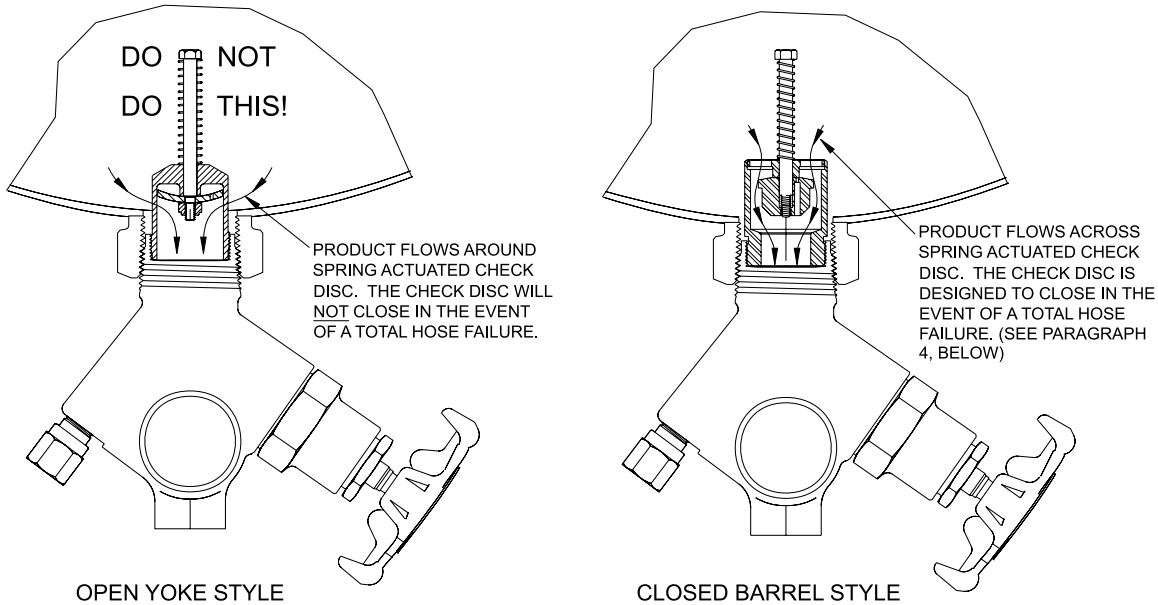


LOADOUT RISER INSTALLATION WITH 2" NPT TEE

3. Bottom of Tank Installations——A common practice, especially in propane bottle filling applications, is to install in the bottom of the tank a withdrawal valve that incorporates an integral excess flow valve feature. These valves are mounted into standard thread size couplings without dip tubes as shown below. In these applications it is essential that a “Barrel Style” excess flow valve be used to promote a safety shutoff in the event of a total hose failure. A housing on the “Barrel Style” excess flow valve encloses the spring loaded check disc, and functions in the same manner as if a dip tube were installed. In operation, use of the “Barrel Style” excess flow valve forces the liquid to flow and create a differential pressure across the check disc, which is designed to close in the event of a total hose failure. An “Open Yoke Style” excess flow valve must not be used in this application, as it will allow liquid flow to bypass the check disc, and not create sufficient differential pressure to close the valve in the event of a total hose failure.

Installation Recommendations:

1. Never use an “Open Yoke Style” excess flow valve without a dip tube.
2. A “Barrel Style” excess flow valve may be used with or without a dip tube.



OPEN YOKE STYLE
EXCESS FLOW VALVE
(IMPROPER INSTALLATION)

CLOSED BARREL STYLE
EXCESS FLOW VALVE
(PROPER INSTALLATION)

BOTTOM OF TANK WITHDRAWAL VALVE INSTALLATION

4. Hose Length and Size——In combination with the proper size Dip Tube or a 2" Riser Tee, all Excess Flow Valves are designed for use with 12.5 ft. long hoses. A maximum length of 15 ft. may be used, however a slightly higher closing rate can be expected.

NOTE: Never use reducer bushings at the valve outlet in order to use a smaller diameter hose. If the valve has a 1" NPT outlet connection use a 1" hose. If the valve has a 1-1/4" NPT outlet connection use a 1-1/4" hose. The flow restriction caused by the reduced diameter of a smaller hose will not allow the proper closing force on the Spring Actuated Check Disc, and the Excess Flow Valve may not close in the event of a hose failure.

B. PROPER OPERATING PROCEDURE

1. Fully Opened Withdrawal Valve——Excess Flow Withdrawal Valves must be in the Full Open Position when in operation. A partially opened valve will restrict the flow and not allow the full flow closing rate required to shut the valve in the event of a total hose failure.
2. Pinched or Partially Cut Hoses——When connecting hoses between Nurse Tanks and Tool Bars, care must be exercised to insure that the hose cannot be pinched or cut while in motion or in sharp turns.

   NOTE: Pinched or partially cut hoses will not allow sufficient discharge of NH3 to close the valve. The hose must be severed completely for the safety feature of the Excess Flow Valve to function.
3. What do Excess Flow Valves protect?
   (a) Excess Flow Valves protect the hose leaving the Nurse Tank Withdrawal Valve up to the Tool Bar Safety Coupler connection only. Hoses connecting valves or meters located on the tool bar are not protected by the Excess Flow Withdrawal Valve at the Nurse Tank.
   (b) Excess Flow Valves are designed to close at the flow rate listed on the information tag attached to the handwheel. The closing flow rate is different for other fluids.
   (c) Excess Flow Valves are designed to close within a reasonable range of ambient conditions at the maximum rated capacity of a correspondingly sized hose when fully ruptured adjacent to a valve. Any flow piping obstruction (i.e. a reduced diameter coupling, a valve size reduction or a reduction in hose size) either upstream or downstream will prevent it from closing.
   (d) Shut-Off Valves with an integral Excess Flow Valve are also designed to close in the event that the valve body, extending above the nurse tank, is sheared off or broken as in a nurse tank roll over.
4. What happens when an Excess Flow Valve closes?

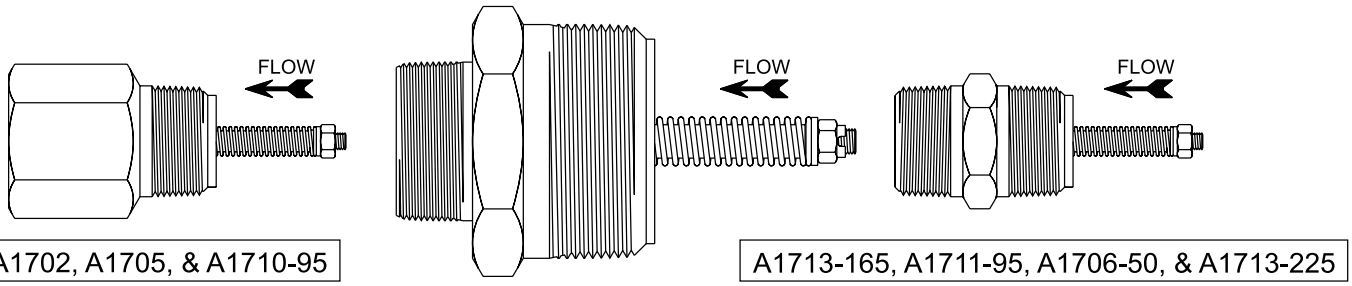
   If an Excess Flow Valve closes as the result of a hose failure, the spring loaded check disc immediately moves to form a metal to metal seal with the valve body. At this point most of the NH_3 liquid flow will cease. Per ANSI Code K61.1 the check disc is required to have a bypass hole drilled through the thickness of the disc to allow equalization of pressure. This hole will allow a small discharge of NH_3 to continue. Tests have shown that on a Squibb-Taylor Model A1598 Excess Flow Valve with a Closing Flow Rate of 50 GPM of NH_3 liquid, the flow rate will be reduced to .44 GPM after closing. This means that approximately 99% of the liquid flow has been stopped. When a hose failure occurs the appearance that the valve may not have closed properly is due to the fact that NH_3 liquid expands 800 times as it flashes to a vapor in the atmosphere. A cloud of vapor will be seen even though the valve has closed properly. An Excess Flow Valve is not intended to shut off bubble tight when closed, but only to reduce the flow of vapor to a manageable amount until the main valve can be safely closed.

C. RECOMMENDATIONS

(a) Only Use hoses that are specifically labeled for use with NH3 or LP-Gas.
(b) Hoses should be removed from service by their marked replacement date if not before, due to regularly conducted inspections that may reveal general deterioration from use and ultra-violet exposure.
(c) Keep Nurse Tank and Riser Loadout hoses as short as possible.
(d) Hoses should be disconnected and stored indoors during the off season.

1700 Series Excess Flow Valves for LP-Gas and NH_3 Service

This Section Covers Valve Models A1702, A1703, A1705, A1708, A1713-165, A1715-165, A1706-50, A1710-95, A1711-95, A1713-225, and A1715-225. They Range In Pipe Size From 3/4" NPT to 3" NPT, And Are Shown Below In Three Different Configurations; Styles A, B and C.



A1702, A1705, & A1710-95

Style A

A1703, A1708, A1715-165, & A1715-225

Style B

A1713-165, A1711-95, A1706-50, & A1713-225

Style C

The 1700 Series Excess Flow Valves are In Line or Tank valves and are not an integral part of a withdrawal or shut off valve. Their purpose however is the same, and they are designed to close in the event product flow exceeds the closing rate of the valve, as would happen if a hose or system piping fully ruptured or was totally pulled apart. To ensure that an excess flow valve will function properly during normal operation, and will also provide emergency closing when required, it is imperative that proper Installation and Operating procedures are followed and Periodic Testing is performed. The purpose of this bulletin is to set forth general safety practices for the installation, and operation of LP-gas and NH3 Excess Flow Valves. It is not intended to be an exhaustive treatment, and should not be interpreted as precluding other procedures which would enhance safe operating conditions.

A. PROPER INSTALLATION PROCEDURE

1. An excess flow valve permits the flow of liquid or vapor in either direction, however this flow is controlled in only one direction, (the direction of the arrow stamped on the valve). If the flow in the direction of the arrow exceeds the closing flow rate of the valve, it is designed to automatically close.
2. Before installing and operating an excess flow valve, take steps to ensure the removal of pipe scale, welding slag, or other debris that could become lodged between the valve disc and the seat.
3. Do Not reduce pipe diameters on the upstream or downstream side of an excess flow valve. An excess flow valve depends on flow in order to close, therefore if the downstream piping is too small, or is unusually long, or restricted by too many elbows, tees, and other fittings, consideration should be given to the use of larger pipe fittings.

NOTE: When sizing an excess flow valve, good piping practice and field experience suggests selecting a valve with a rated closing flow of approximately 50 percent greater than the anticipated normal flow of the system. This is important because valves which have a rated closing flow very close to the normal flow may chatter or even close when surges in the line occur during normal operation, or due to the rapid opening of a control valve.

CAUTION: The flow rating of the piping, fittings, pump, valves, and hose in an LP-Gas or NH_3 system must be greater than the flow rating of the excess flow valve. If branch piping or restrictions with a smaller capacity than the total system are incorporated, additional excess flow valves must be installed at these points.

B. PROPER OPERATING PROCEDURE

1. All valves on the upstream or downstream side of an excess flow valve must be in the full open position. Partially opened valves will restrict the flow and not allow the full flow closing rate required to shut the valve in the event of an emergency.
2. Pinched or partially cut hoses, or small ruptures in piping or fittings will not allow sufficient discharge of LP-gas or NH3 to close an excess flow valve. It is therefore imperative that all operating personnel be familiar with the location and mode of operation of all ESV (Emergency Shutdown Valves) in the piping system.
3. How an excess flow valve works: When a line or a hose is completely broken, the spring loaded check disc immediately moves to form a metal to metal seal with the valve body. At this point most of the LP-gas or NH3 liquid flow will cease. The valve will remain closed until the pressure on both sides of the check disc is equalized via the bypass hole through the check disc. At this time the spring will automatically reopen the valve. When a line is completely severed, pressure cannot equalize and the excess flow valve will remain closed until the line is repaired. The bypass hole in the check disc will allow a small amount of product to discharge, and a cloud of vapor will be seen even though the valve has closed properly. An Excess Flow Valve is not intended to shut off bubble tight when closed, but only to reduce the flow of vapor to a manageable amount until a shut off valve or ESV can be safely closed.

C. TESTING OF EXCESS FLOW VALVES

1. After an excess flow valve is installed, the system should be tested for proper operation by simulating a break downstream in the system. 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. To test the unit, pressure the system and then open a shutoff valve quickly at the farthest point in the piping that the excess flow valve is intended to protect. There should be a sudden decrease in flow, and an audible “click”, indicating that the valve has closed and is working properly.

WARNING: Only trained personnel should test excess flow valves. It should be under safe conditions, and with the permission of local authorities, since testing with flammable or toxic gases is hazardous.

2. If after testing, the excess flow valve does not operate properly, a thorough check of all piping, fittings, or hoses should be made to eliminate any restrictions that may have reduced the flow of the valve below its maximum closing flow.
3. It is recommended that all excess flow valves be tested annually or on a regularly scheduled basis to ensure they are still functional. Whenever possible, excess flow valves should be removed and visually inspected for corrosion, scale, or other signs of physical deterioration. The check disc must be able to be depressed against the spring onto the metal to metal seat and then snap back open to ensure it is still in operating condition.

CAUTION: Testing of an excess flow valve will not prove that the valve will close in an emergency situation. It will only check the valves condition (no obstructions on the seat), and the flow rate sizing for those test conditions. In an emergency situation system piping may be damaged or broken upstream of the excess flow valve so that the escaping product is not passing through the excess flow valve. Good system piping design dictates that all piping, valves, and fittings be as rigid and well supported as possible to allow proper operation of the excess flow valve during emergency conditions. Since the exact location or nature of an emergency cannot be predicted, it is recommended that when possible, additional shutoff protection by TriPod Safety Couplings at the bulkhead and ESV valves with remote operating controls be provided in addition to excess flow valves.

D. MAINTENANCE

Excess flow valves are non-repairable. Replace non-functioning valves.