September 2012

Types C471 and C477 Jet Bleed Internal™ Valves

Introduction

Types C477 and C471 Jet Bleed Internal™ Valves are designed to provide rapid equalization of tank pressure and downstream line pressure, providing a fast valve response time for quick valve opening. These may be used as primary shutoff valves, excess flow valves, and back check valves for Propane, Butane, and NH_3 (anhydrous ammonia) transfers between stationary bulk storage tanks and mobile transports for fill or delivery applications of liquid or vapor gas, and on in-line applications. The valves can be used in installations with or without pumps and compressors. Non Underwriters Laboratories (UL®) listed types are available with a variety of trim types and body styles and can be used on other compressed gases, but the user should check with the factory to make sure the valves are suitable for the particular service. Actuation of the valve can be achieved manually, by cable, or with a pneumatic actuator.

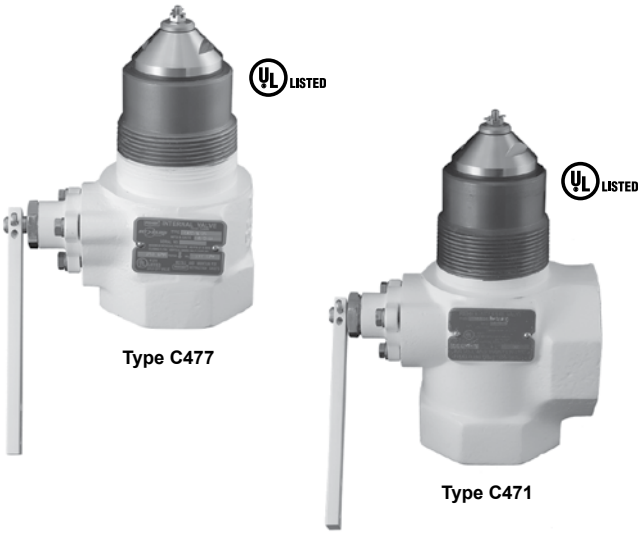


Figure 1. *Types C471 and C477 Jet Bleed Internal™ Valves*

Features

- **Patented rapid equalization bleed area** – Provides fast valve response for quick opening.
- **Unique Serviceability Features** – Stainless trim parts and poppet designed with integral wrench flat for easy maintenance.
- **Durable Design** – Stainless poppet and stem interface smoothly for a long wear life.
- **Excess Flow Closure** – Functions when flow exceeds the valves rated capacity or piping is sheared off at the valve.
- **Back Check Feature** – Allows reverse flow, fill with or without actuator device in valve open position.
- **Spring loaded Polytetrafluoroethylene (PTFE) stub shaft packing.**
- **PTFE wear pads Rulon® Bushings at critical wear points**
- **Manual, Cable, or Air Open/Close valve actuators.**
- **Thermal Fusible links or plugs melt at 212 to 220°F / 100 to 104°C and allow valve closure in the event of a fire at the valve.**

D450244T012

Specifications

Body Size and End Connection Style

Inlet: 2 or 3-inch MNPT / DN 50 or 80
Outlet: 2 or 3-inch FNPT / DN 50 or 80

Number of Outlets

Type C471: 2 (side and straight through)
Type C477: 1 (straight through)

Excess Flow Springs

Half Coupling Flows:

2-inch Sizes / DN 50: 105, 150, and 250 GPM / 397, 567, and 946 L/min
3-inch Sizes / DN 80: 160, 265, 375, and 460 GPM / 605, 1003, 1419, and 1741 L/min

Full Coupling Flows:

2-inch Sizes / DN 50: 60, 80, and 130 GPM / 227, 302, and 492 L/min

3-inch Sizes / DN 80: 120, 230, 320, and 380 GPM / 454, 870, 1211, and 1438 L/min

Maximum Allowable Inlet Pressure(1)

400 psig / 27.6 bar WOG

Temperature Capabilities(1)(2)

-20 to 150°F / -29 to 66°C

Construction Materials

Steel	Body and Operating Lever
Stainless steel	Stem Assembly, Excess Flow Spring, Spring Seat, Closing Spring, Disc Holder, Disc Retainer, Screw, O-ring Seat, O-ring Retainer, Cotter Pin, Spring, Shaft, Screen, Travel Stop, Screen Cap, Bolt, Gasket, and Lock Washer
Plated steel	Nut, Washer, Bonnet Nut, Guide Bracket, and Cap Screw
Polyurethane	Rod Wiper
PTFE	Bushing, Packing Adaptor, and Packing Ring
Nitrile (NBR) (Standard Construction)	Main Disc and Bleed Disc
Other Disc and O-ring Material Available from Factory	PTFE, Fluorocarbon (FKM), Neoprene (CR), Ethylene-Propylene (EPDM), and Kalrez®

Closing Flow and Vapor Capacity

See Table 2

Approximate Weights

2-inch Sizes / DN 50:
Type C471: 11 pounds / 5 kg
Type C477: 9 pounds / 4 kg

3-inch Sizes / DN 80:
Type C471: 21 pounds / 10 kg
Type C477: 16 pounds / 7 kg

1. The pressure/temperature limits in this Bulletin and any applicable standard or code limitation should not be exceeded.
2. Product has passed Fisher® testing for leakage down to -40ºF / -40ºC.

Kalrez® is a mark owned by E.I. du Pont de Nemours and Co.

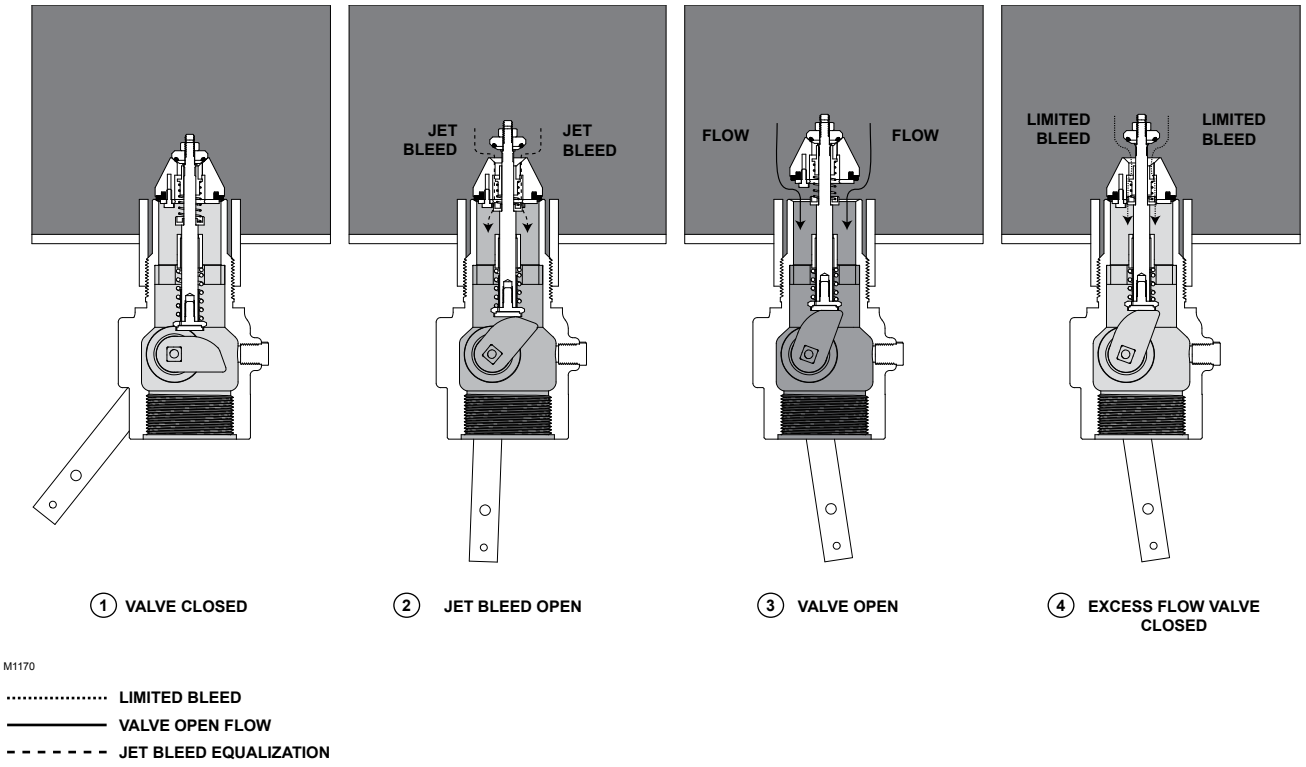


Figure 2. *Typical Operational Schematic*

Principle of Operation

Refer to the operational schematic, Figure 2. In view #1, the valve is held closed by both tank pressure and the valve's closing spring. There is no leakage past the resilient seats in the poppet to the valve outlet. The valve is opened by moving the operating lever to approximately midpoint in its 70° travel (view #2). This allows the cam to place the rapid equalization portion of the valve stem in the pilot opening, permitting a larger amount of product to bleed downstream than if the operating lever were moved to the full open position. When tank and downstream pressure are nearly equal after a few seconds, the excess flow spring pushes open the main poppet (view #3) and the operating lever can be moved to the full open position.

Note

If tank pressure is greater than the valve's outlet pressure, the main poppet will remain in the closed position. If valve outlet piping is closed off by other valves, however, product bleeding through the pilot will increase until it nearly equals tank pressure and the main poppet opens. The main poppet will not open if valve outlet piping is not closed off so that the outlet pressure can approach tank pressure.

Once the main poppet opens, a flow greater than the valve's excess flow spring rating or a sufficient surge in flow forces the main poppet closed against the excess flow spring (view #4). The pilot valve allows a small amount of product to bleed, but much less than view #2 where the rapid equalization portion of the stem is placed in the pilot opening. When the operating lever is moved to the closed position, the valve closes completely and seals tightly (view #1).

	MODEL NUMBER						SIZE		SPRING RATE
EXAMPLE:	**C**	**4**	**7**	**1**	**N**	**-**	**24**	**-**	**26**

Symbol Description

C	Product Family

4	UL® Listed
8	Non UL® Listed

7	Ductile Iron Body
8	Steel Body
9	Stainless Body

7	Straight Through Flow
3	Double Flanged Body
4	Single Flanged Body
1	Tee Body (Flanged and NPT)

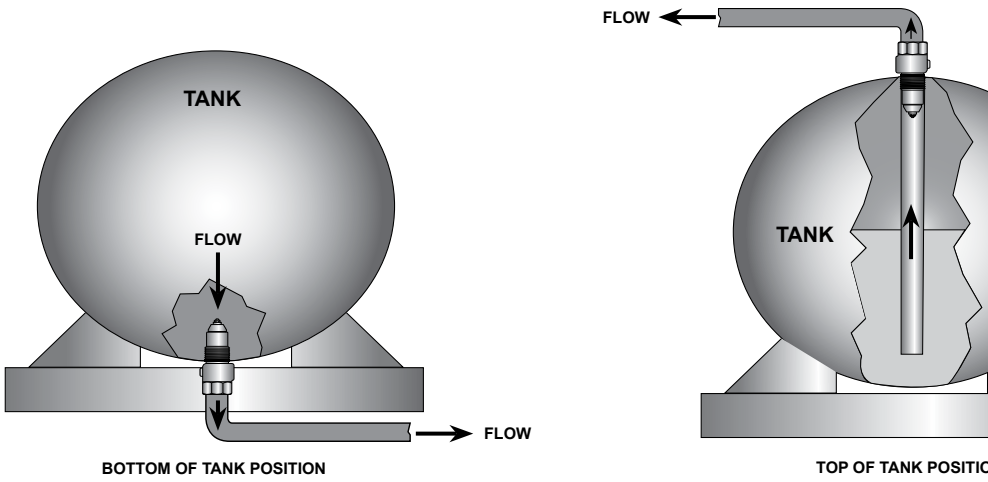
	Nitrile (NBR) (**Standard**, Only Nitrile (NBR) has UL® Approval)
V	Fluorocarbon (FKM) Trim
T	PTFE Trim
N	Neoprene (CR) Trim
S	Stainless Steel Body/Gland*
M	Manual Latch Factory Installed
ST	Stainless steel Gland and PTFE Trim

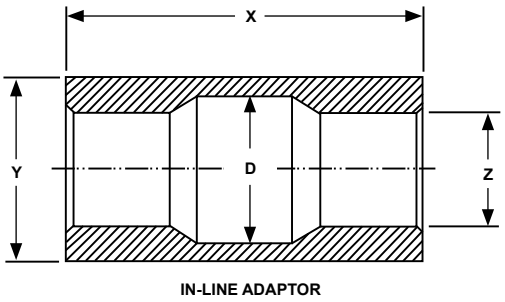
10	1-1/4-Inch / DN 32
16	2-Inch / DN 50
24	3-Inch / DN 80
32	4-Inch / DN 100

10	105 GPM / 397 L/min
15	150 GPM / 568 L/min
16	160 GPM / 606 L/min
22	220 GPM / 833 L/min
25	250 GPM / 946 L/min
26	265 GPM / 1003 L/min
37	375 GPM / 1419 L/min
46	460 GPM / 1741 L/min

* The Type C891 has Stainless steel body as Standard. 'S' callout on a Type C891 stands for a Stainless steel Gland.
For each product family, not all options are available. To check the availability of type numbers specified above, contact or visit your local LP-Gas Equipment distributor.

Figure 3. *Fisher® Internal Valve Numbering System*





IN-LINE ADAPTORS			
Z	Dimensions, Inches / mm		
	X	Y	D
1-1/4-inch FNPT / DN 32	4.70 / 119	2.75 / 70	2.05 / 52
2-inch FNPT / DN 50	6.77 / 172	3.5 / 89	2.80 / 71
3-inch FNPT / DN 80	7.53 / 191	4.5 / 114	3.80 / 97

Figure 4. *Internal Valve Flow Positions*

Table 1. *Closing Flow - Propane and NH_3*

SIZE	TYPE NUMBER		CLOSING FLOW GPM / L/min PROPANE			CLOSING FLOW GPM / L/min NH_3
	Straight Body	Tee Body	Half Coupling, Bottom of Tank Position*	Full Coupling, Bottom of Tank Position*	Half Coupling, Top of Tank Position*	Half Coupling, Bottom of Tank Position*
2-inch / DN 50	C477-16-10	C471-16-10	105 / 397	60 / 227	120 / 454	95 / 360
	C477-16-15	C471-16-15	150 / 568	80 / 303	170 / 643	135 / 511
	C477-16-25	C471-16-25	250 / 946	130 / 492	250 / 946	226 / 855
3-inch / DN 80	C477-24-16	C471-24-16	160 / 606	120 / 454	180 / 681	145 / 549
	C477-24-26	C471-24-26	265 / 1003	230 / 871	290 / 1098	239 / 905
	C477-24-37	C471-24-37	375 / 1419	320 / 1211	395 / 1495	339 / 1283
	C477-24-46	C471-24-46	460 / 1741	380 / 1438	460 / 1741	415 / 1571

* See Internal Valve Flow Positions (Figure 4) for description of Bottom of Tank, Top of Tank, and Horizontal Flow Positions.

Table 2. *Closing Flow and Vapor Capacity*

SIZE	STYLE		VAPOR CAPACITY SCFH / SCMH PROPANE		
	Straight Body	Tee Body	100 psig / 6.90 bar Inlet, Bottom of Tank Position*	100 psig / 6.90 bar Inlet, Horizontal Position*	100 psig / 6.90 bar Inlet, Top of Tank Position*
2-inch / DN 50	C477-16-10	C471-16-10	45,000 / 1274	49,000 / 1388	66,000 / 1869
	C477-16-15	C471-16-15	69,000 / 1954	69,000 / 1954	88,000 / 2492
	C477-16-25	C471-16-25	NOT LISTED	NOT LISTED	NOT LISTED
3-inch / DN 80	C477-24-16	C471-24-16	71,000 / 2011	71,000 / 2011	96,000 / 2718
	C477-24-26	C471-24-26	127,000 / 3596	127,000 / 3596	148,000 / 4191
	C477-24-37	C471-24-37	178,000 / 5040	178,000 / 5040	186,000 / 5267
	C477-24-46	C471-24-46	NOT LISTED	NOT LISTED	NOT LISTED

* See Internal Valve Flow Positions (Figure 4) for description of Bottom of Tank, Top of Tank, and Horizontal Flow Positions.

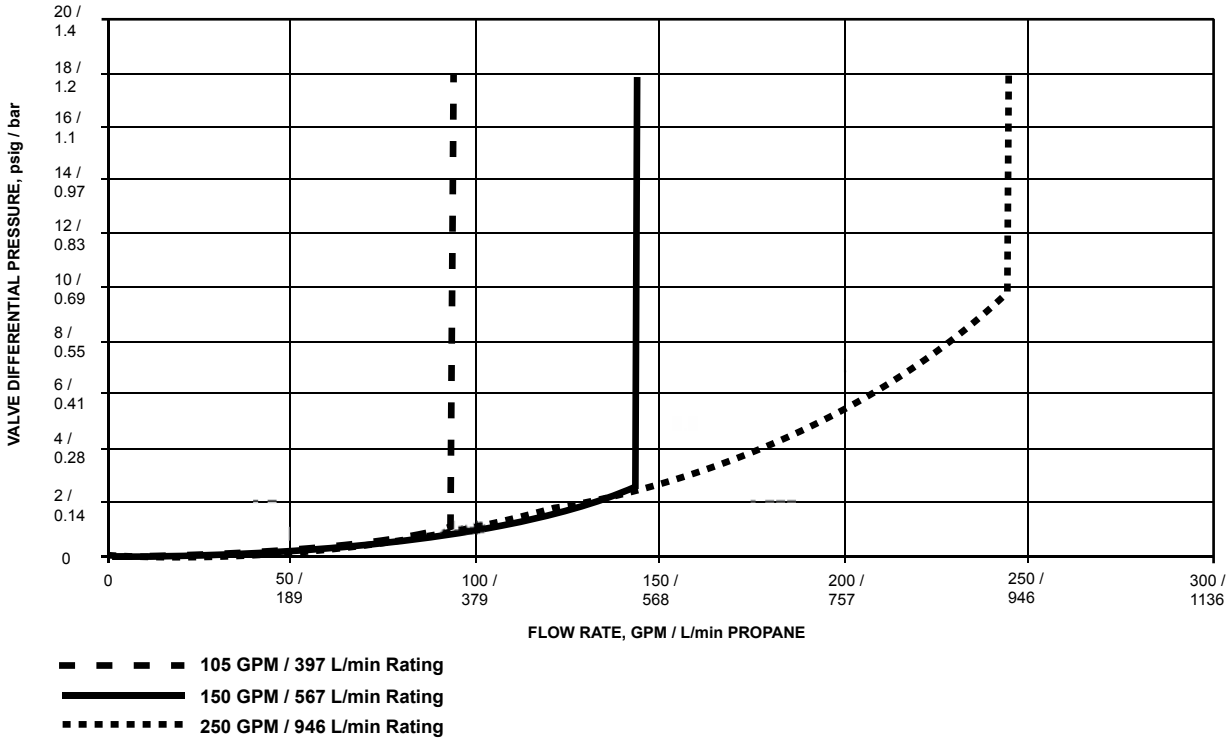


Figure 5. *Type C477/471-16 Bottom of Tank Position Flow Curve, Half Coupling*

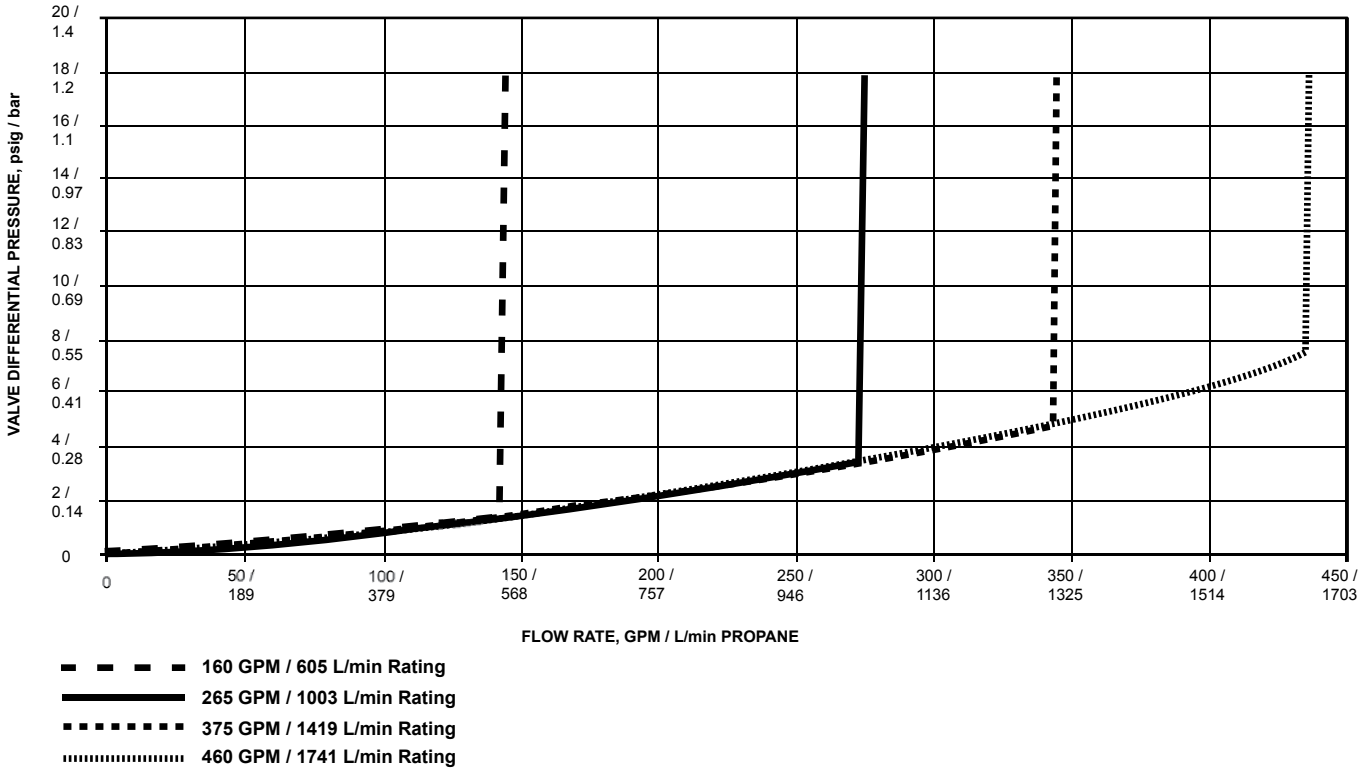


Figure 6. *Type C477/471-24 Bottom of Tank Position Flow Curve, Half Coupling*

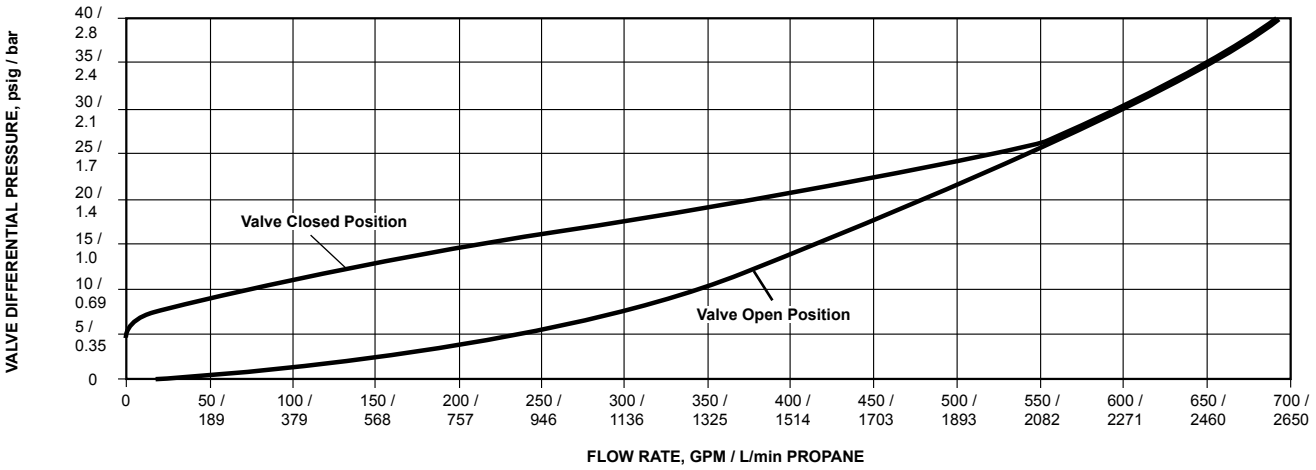


Figure 7. *Type C477-24 Typical Reverse Flow Curve*

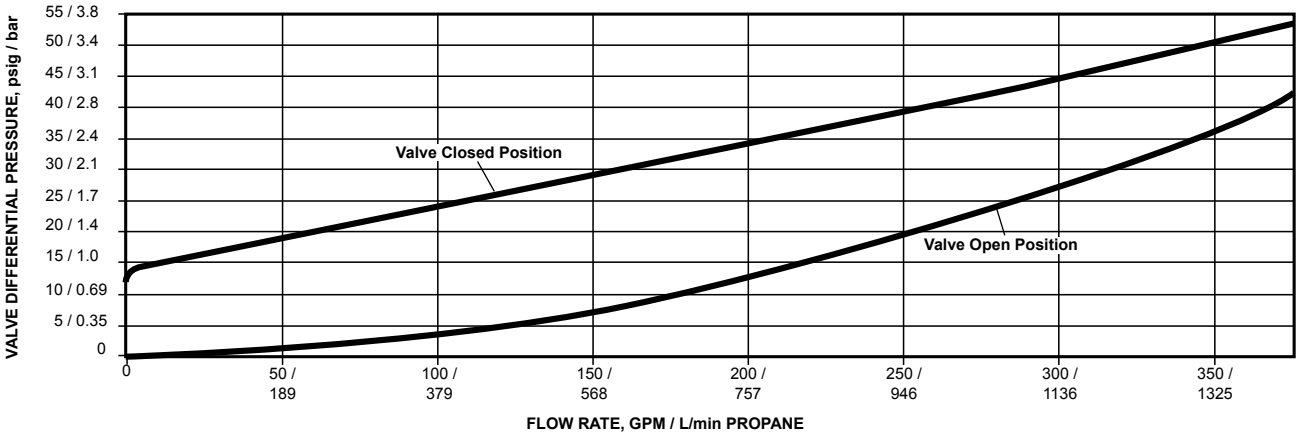


Figure 8. *Type C477-16 Typical Reverse Flow Curve*

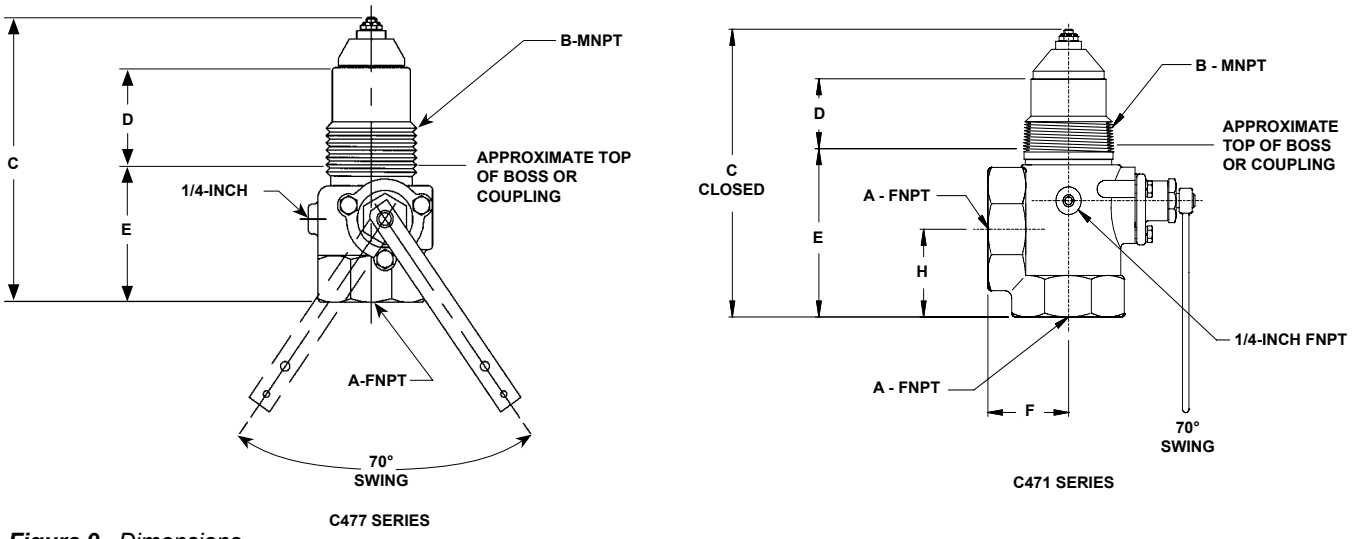


Figure 9. *Dimensions*

Table 3. *Dimensions*

TYPE NUMBER	A, INCH FNPT / DN	B, INCH MNPT / DN	DIMENSIONS, INCHES / mm					
			C	D	E	F	H	INSTALLATION CLEARANCE DIAMETER
C471-16	2 / 50	2 / 50	8.07 / 205	2.40 / 61	4.05 / 103	2.76 / 70	2.66 / 68	10.00 / 254
C471-24	3 / 80	3 / 80	9.00 / 229	2.60 / 66	4.57 / 116	3.25 / 83	3.26 / 83	13.38 / 340
C477-16	2 / 50	2 / 50	8.07 / 205	2.40 / 61	4.05 / 103	- - - -	- - - -	10.00 / 254
C477-24	3 / 80	3 /80	9.00 / 229	2.60 / 66	4.57 / 116	- - - -	- - - -	13.38 / 340

Ordering Information

To order, refer to the table below and specify the type number that satisfies your requirement. Then, contact or visit your local LP-Gas Equipment Distributor for availability.

SIZE	TYPE NUMBER		FLANGE CONNECTION SIZE, INCHES		ACTUATION METHOD AND DEVICE	
	Straight Body	Tee Body	Inlet	Outlet	Air	Manual with Thermal Latch
2-inch / DN 50	C477-16-10	C471-16-10	2-inch MNPT / DN 50	2-inch FNPT / DN 50 (Straight) 2 x 2-inch FNPT / DN 50 x 50 (Tee Body)	Type P639	Type P340
	C477-16-15	C471-16-15				
	C477-16-25	C471-16-25				
3-inch / DN 80	C477-24-16	C471-24-16	3-inch MNPT / DN 80	3-inch FNPT / DN 80 (Straight) 2 x 3-inch FNPT / DN 50 x 80 (Tee Body)	Type P639	Type P340
	C477-24-26	C471-24-26				
	C477-24-37	C471-24-37				
	C477-24-46	C471-24-46				
Please Contact Your Local LP-Gas Equipment Distributor for Availability of Non-Standard Options.						

LP-Gas Equipment

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