



# Small, Yet Flexible

## 650/655 Fractional Valves

### Application

Alfa Laval's Tri-Clover® brand range of fractional valves has been designed for applications requiring a secure, sanitary or sterile environment within the food, beverage, pharmaceutical, cosmetic or biotechnology processing industries. The self-draining ports and ease of operation make the Tri-Clover® brand fractional valves ideal for processes where an uncompromising sanitary environment is demanded. The many design options enable the processor to match the valve to the specific application.

### Working principle

The valve is operated by means of a pneumatic actuator or manual hand operator.

### Standard Design

Alfa Laval's Tri-Clover® brand Fractional Valve is available as a relief, sample, check, air-actuated, manual shut-off or divert valve. Our fractional valves have a sanitary design which incorporates a polished ID and self-draining ports. This helps to minimize the threat of contamination and avoid product entrapment. Our fractional valves have a unique design that calls for minimal number of components and quick-couple Tri-Clamp® body connections which are easy and fast to take down and reassemble. There is a wide selection of body styles and seat materials. The shut-off and relief are available either as a tee or cross body. Other design features include: corrosion resistant type 316L stainless steel stem, bonnet and valve body construction.

### Series 650/655 Valve Actuators and Manual Operators

#### Actuator Air Supply Specifications

- Air pressure range is 50-60 PSI (3.5-4.1 BAR)
- Air-volume required at 50 PSI  
Normally Closed 1¾ cu. in.  
Normally Open 2¾ cu. in.
- Effective operating area is 2.19 sq. inches
- Filtered air and a pressure regulator are required
- Lubricated air is not required

#### Type 10 Actuator

(Air to Close - Spring to Open) Used when a "normally open" valve is required.

Tube OD Size	Product Line Pressure (PSI) actuator will close against at ambient temperature	
	½" (12.7 mm)	¾" (19 mm)
50 PSI (3.5 bar)	195 PSI (13.4 bar)	195 PSI (13.4 bar)
60 PSI (4.1 bar)	230 PSI (15.8 bar)	230 PSI (15.8 bar)



650 and 655 Fractional Valves

#### Type 20 Actuator

(Air to Open - Spring to Close) Used when a "normally closed" valve is required for fail-safe operation. In the event of air failure, spring automatically closes the valve.

Tube OD Size	Product Line Pressure (PSI) actuator will close against at ambient temperature
½" (12.7 mm)	150 PSI (10.3 bar)
¾" (19 mm)	100 PSI (6.9 bar)

#### Type 30 Actuator

(Air to Open - Air to Close)

For applications requiring air both ways. No spring is used in the actuator.

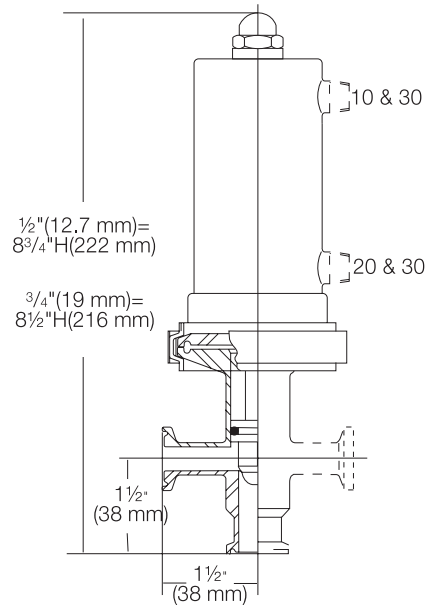
#### Type 40 Manual Operator

- Standard handle is a durable UHMW polyethylene handle
- Aluminum bronze handle also available for temperatures above 150°F (66°C) or Pressures above 150 PSI (10 BAR)

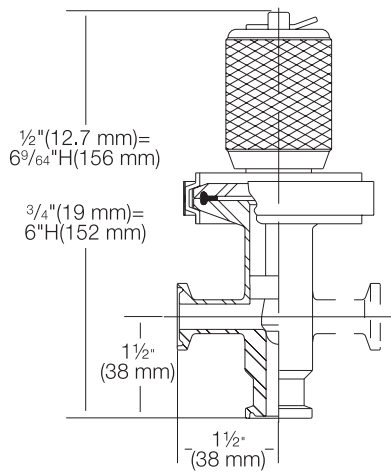
#### Type R40 Relief Handle for 650 Valve

- UHMW polyethylene handle with relief spring
- ½" valve - 12-80 PSI
- ¾" valve - 6-60 PSI

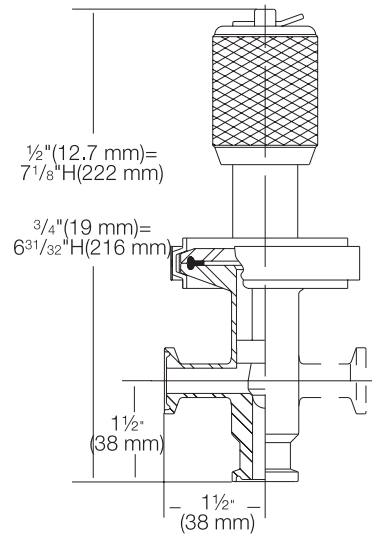
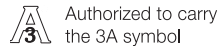
**Series 650/655 Dimensions**



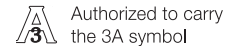
**Air Actuated Valve**  
 650-10M-Actuator (tee body)  
 650-30M-Actuator (cross body)



**Manual Shut-Off Valve**  
 650-10M-40 (tee body)  
 650-30M-40 (cross body)  
 (See page 4 / Cv Factor Chart)

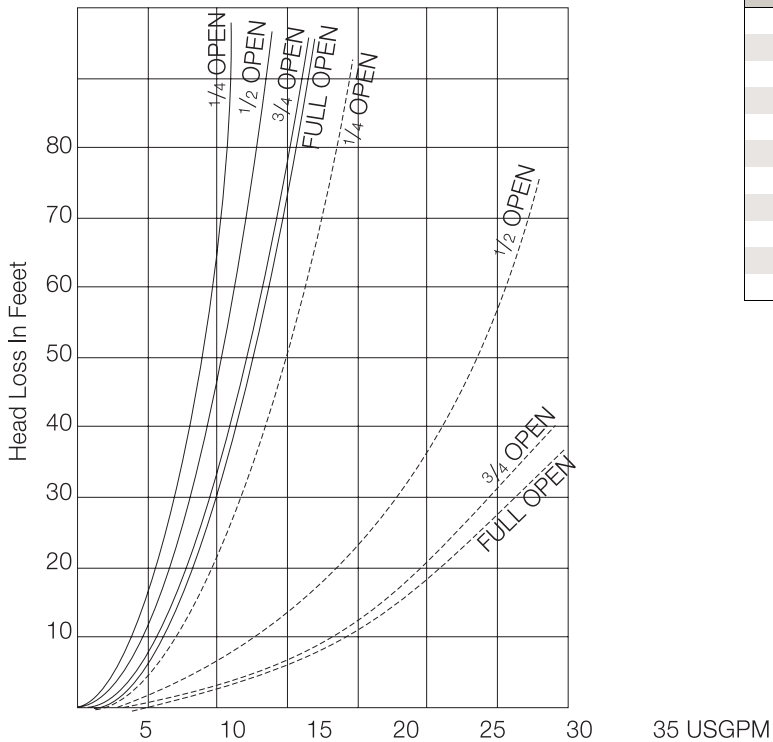


**Relief Valve**  
 650-10M-R40 (tee body)  
 650-30M-R40 (cross body)



## Series 650 Shut-Off

Head Loss Curve



Gal/Min.	5	10	15	20	25	30	35
Ltr/Min.	18.4	37.8	56.8	75.7	94.6	113.6	132.5

### Head Loss Curve

Model 650 Manual/Shut-Off Valve

— — 3/4 inch (19 mm)      — 1/2 inch (12.7 mm)

## CV Factors for manual and shut-off valves

% Valve Stroke	1/2" (12.7 mm)	3/4" (19 mm)
10	1.1	1.4
20	1.6	2.6
30	1.9	3.7
40	2.1	4.9
50	2.2	4.9
60	2.2	6
60	2.3	7
70	2.4	7.8
80	2.45	8.8
90	2.5	9.1
100	2.6	9.2

## 650 Series Plug and Seat Design

Series 650 Manual and Air Actuated Valves are available in two seat styles:

### The Lip Seal

Our patented, economical one-piece plug has no o-rings to replace. Available in fluorelastomer\* for temperatures up to 250°F (121°C), or PTFE for temperatures up to 120°F (49°C), or where fluorelastomer is incompatible with the product.

### O-Ring Seal

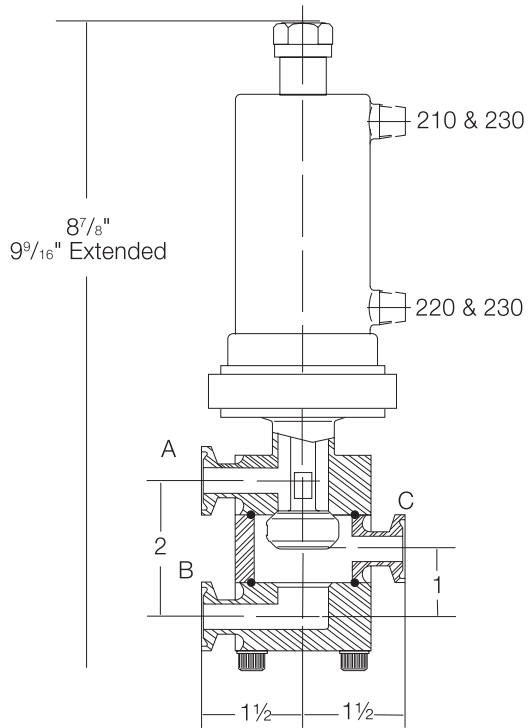
PTFE Material, with fluorelastomer o-ring, is ideal where application calls for a PTFE plug, and the fluorelastomer o-ring is acceptable. For temperatures up to 250°F (121°C)

\*Fluorelastomer and PTFE lip seal not recommended for use in cross body valves (30M). Use only PTFE Plug with O-ring in type 30M valves.

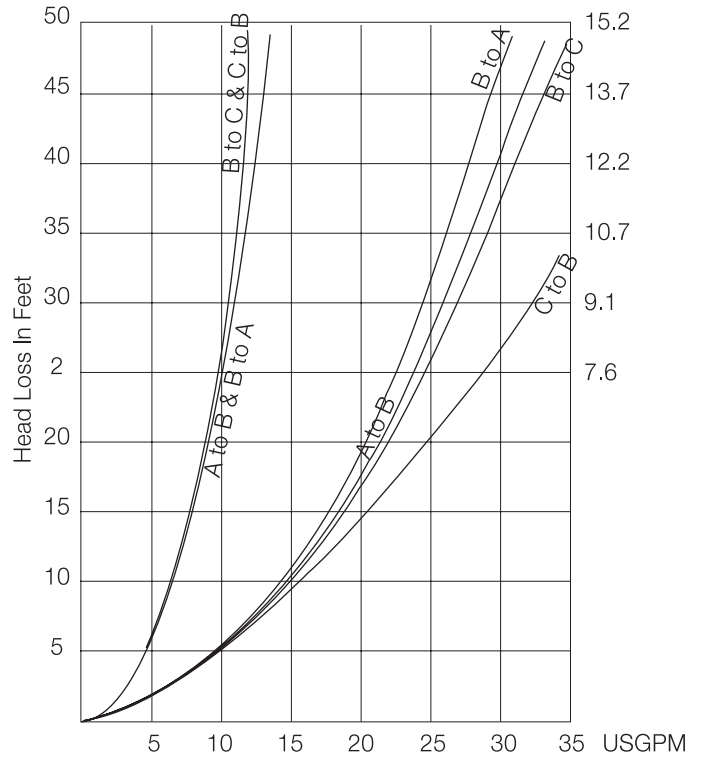
Alfa Laval Fractional Valves carry U.S. Patent Number 4,570,665.

## Series 655 Divert Valve

Dimensions



Head Loss Curve



### 655 Series Plug and Seat Design

Series 655 Air-Actuated Valves are available with a bonded elastomer plug.

#### Molded Seat

Standard material is fluorelastomer for temperatures up to 250°F (121°C). Other materials available.

\*Fluorelastomer and PTFE lip seal not recommended for use in cross body valves (30M). Use only PTFE Plug with O-ring in type 30M valves.

**Note:**All elastomers used in Alfa Laval Fractional Valves are compounded to FDA standards.

Gal/Min	5	10	15	20	25	30	35
Ltr/Min.	18.4	37.8	56.8	75.7	94.6	113.6	132.5

#### Head Loss Curve

Model 655 Air-Actuated Valve

— —  $\frac{3}{4}$  inch (19 mm) — —  $\frac{1}{2}$  inch (12.7 mm)

## Body Styles Available:

Shut-off  
Divert  
Relief  
Sample  
Check

## Port Connection Sizes:

1/2" (12.7 mm) tube OD  
3/4" (19 mm) tube OD

## Connection Type:

Tri-Clamp®

## Materials of Construction:

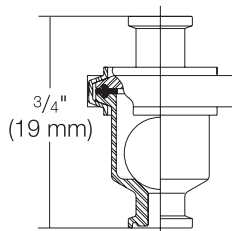
Valve body	stainless steel 316L Standard
Bonnet	stainless steel 316L Standard
Stem	stainless steel 316L Standard

## General Service Ranges:


Fractional sizes valves are nominally rated up to 100 PSI (6.9 BAR) at 250°F (121°C) or 230 PSI (15.8 BAR) at 72°F (22°C). Refer to section on Plug and Seat Design for further detail. Contact Alfa Laval if higher pressure or temperature ratings are called for.

## Dimensions for 660 and C45 Valves

### C45 Check Valve (3A version)



Check Valve  
C45MP (Ball Check)

 Authorized to carry the 3A symbol

### C45MPS (Plug/Spring Check)

- 1/2" (12.7 mm) or 3/4" (19 mm) sizes with Tri-Clamp® end connections
- Available with a 316 stainless steel ball (vertical installation only) or with PTFE plug and spring.
- Relief pressure:
  - 3/4" size 1.5 PSI (0.1 bar)
  - 1/2" size 3 PSI (0.2 bar)

## Options

### Equipment

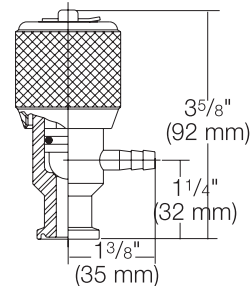
- Handle style/material
- Actuator style

## Ordering

Please state the following when ordering:

- Valve size and style
- Actuator or manual operator type
- Seat Type: Fluorelastomer, EPDM, Buna or PTFE; Lip Seal or O-Ring
- Ball or plug/spring (check valve)

### 660 Sample Valve (3A version)



Sample Valve  
660-10-40

 Authorized to carry the 3A symbol

- Manual valves furnished with durable UHMW polyethylene handle.
- Optional bronze handle available for pressures above 150 PSI (10 BAR) or temperatures 150°F (66°C).
- 660-10 has 1/2" Tri-Clamp® by 1/4" hose barb (pictured above). or 660-10M has 1/2" Tri-Clamp® by 1/2" Tri-Clamp® connections (not pictured).






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The information contained herein is correct at the time of issue, but may be subject to change without prior notice.

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**How to contact Alfa Laval**

Contact details for all countries are continually updated on our website. Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information direct.

 Authorized to carry the 3A symbol