

# TBV-CM – NPT threads



**Combined control & balancing valves for small terminal units**

For modulating control

# TBV-CM – NPT threads

Designed for use in terminal units in heating and cooling systems, the TBV-CM ensures accurate hydronic control and optimum throughput over a long lifetime. IMI Hydronic Engineering's dezincification resistant alloy, AMETAL®, minimizes the risk of leakage.



## Key features

- > **Presetting tool**  
For accurate and easy balancing.
- > **Self-sealing measuring points**  
For quick and easy measurement.
- > **Shut-off function**  
Ensures straightforward maintenance procedures.

## Technical description

### Application:

Heating and cooling systems.

### Functions:

Control  
Balancing  
Pre-setting  
Measuring  
Shut-off (for isolation during system maintenance)

### Dimensions:

1/2" – 1"

### Pressure class:

PN 16 (230 psi)

### Temperature:

Max. working temperature: 248°F  
Min. working temperature: -4°F

### Lift:

0.157 in

### Leakage rate:

Tight sealing

### Material:

Valve body: AMETAL®  
Valve plug: PPS (polyphenylsulphide)  
Seat seal: EPDM/Stainless steel (1/2"-3/4"). EPDM/AMETAL® (1").  
Spindle seal: EPDM O-ring  
Valve insert: AMETAL®, PPS (polyphenylsulphide)  
Return spring: Stainless steel  
Spindle: AMETAL®

AMETAL® is the dezincification resistant alloy of IMI Hydronic Engineering.

### Marking:

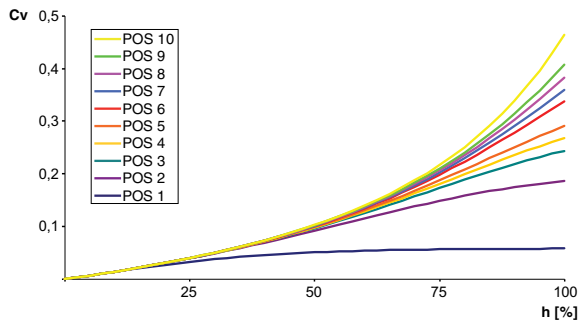
Body: TA, PN 16/150, DN, inch size and flow direction arrow.  
Identification ring on measuring point:  
White = Low flow (LF)  
Black = Normal flow (NF)

### Actuators:

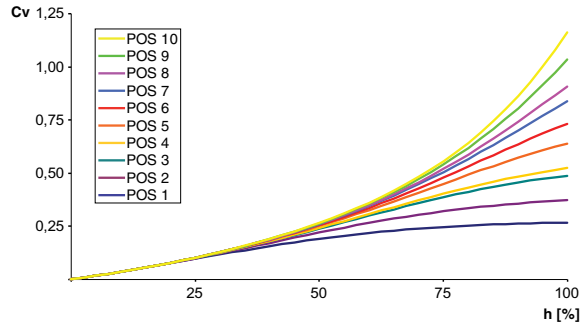
See separate information on EMO TM.

## Valve characteristics

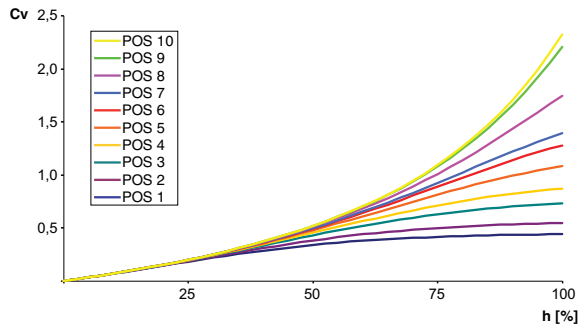
**TBV-CM LF, 1/2", Cvs 0.46**



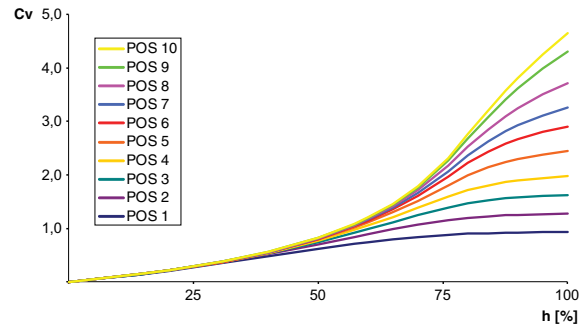
**TBV-CM NF, 1/2", Cvs 1.16**



**TBV-CM NF, 3/4", Cvs 2.33**

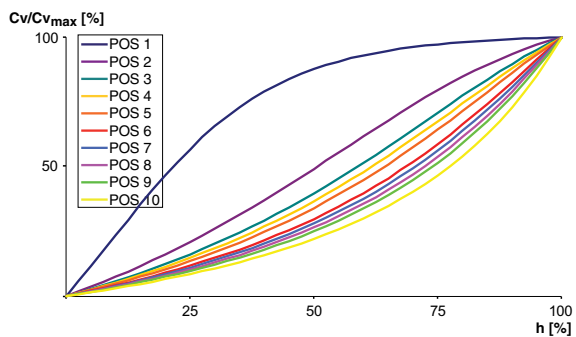


**TBV-CM NF, 1", Cvs 4.65**

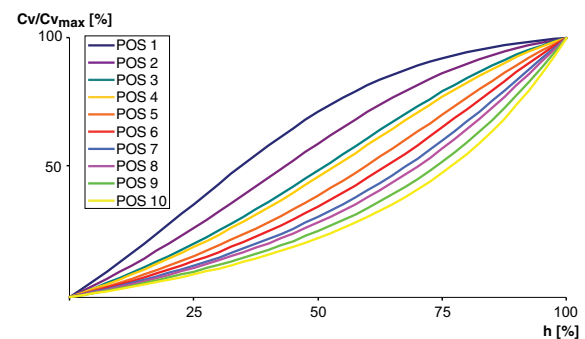


## Standardised valve characteristic

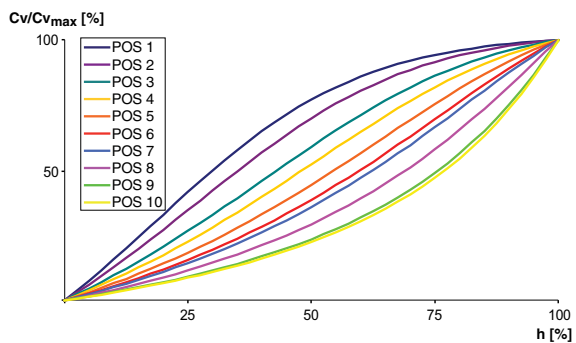
**TBV-CM LF, 1/2", Cvs 0.46**



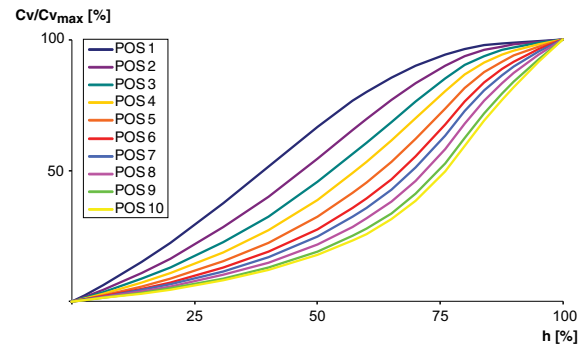
**TBV-CM NF, 1/2", Cvs 1.16**



**TBV-CM NF, 3/4", Cvs 2.33**



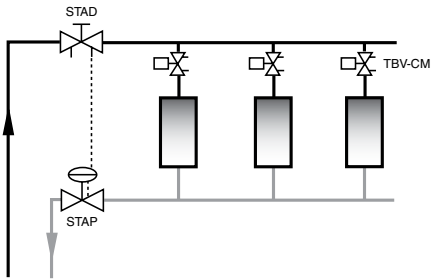
**TBV-CM NF, 1", Cvs 4.65**



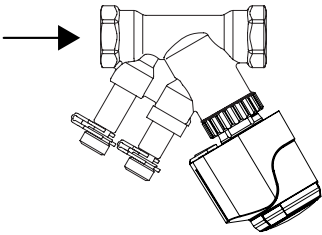
$Cv_{max}$  = gpm at a pressure drop of 1 psi at each pre-setting and fully open valve plug.  
 $Cvs$  = gpm at a pressure drop of 1 psi and fully open valve.  
 $h$  = lift

## Installation

### Application example

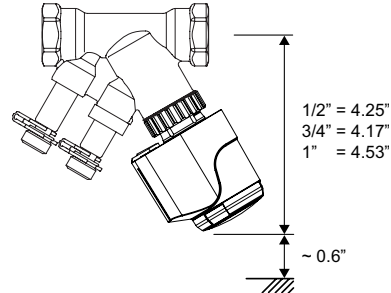


### Flow direction

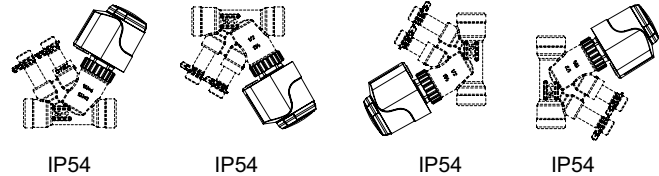


### Installation of actuator

Approx. 0.60 in of free space is required above the actuator.



### TBV-CM + EMO TM



## Sizing

When  $\Delta p$  and the design flow are known, use the formula to calculate the Cv value.

$$Cv = 1.52 \frac{q}{\sqrt{\Delta p}} \quad q \text{ in GPM, } \Delta p \text{ in ft WG}$$

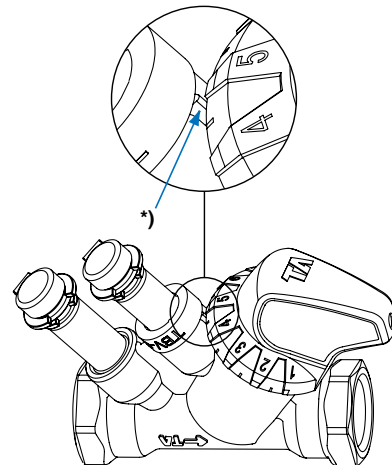
$$Cv = \frac{q}{\sqrt{\Delta p}} \quad q \text{ in GPM, } \Delta p \text{ in psi}$$

## Setting

TBV-CM is delivered with a red protective cap, Article No 52 143-100, which must be used when isolating the valve. TBV-CM is delivered with the pre-setting fully open. Pre-setting of a valve for a given  $Cv_{max}$  value, e.g. corresponding to position 5, is done as follows:

1. Place the presetting tool, Article No 52 133-100, at the valve.
2. Turn the presetting tool so that position 5 is pointing at the index\* of the valve body.
3. Remove the adjustment tool. The valve is now pre-set.

There is a diagram for every valve size that shows the flow for different pressure drops and settings.



## Noise

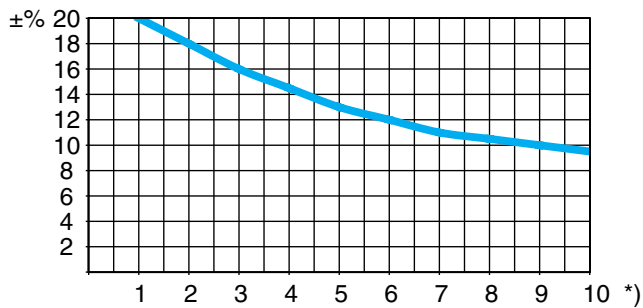
In order to avoid noise in the installation the flows must be correctly balanced and the water de-aerated. Excessive differential pressures can cause noise in the installations, and in that case, differential pressure controllers should be used.

The maximum recommended pressure drop in order to avoid noise is 4.35 psi.

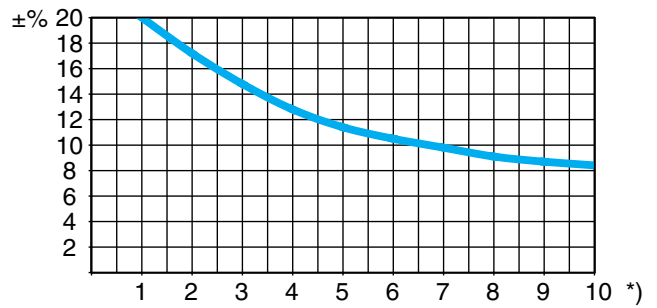
## Measuring accuracy

### Maximum flow deviation at different settings

#### TBV-CM LF

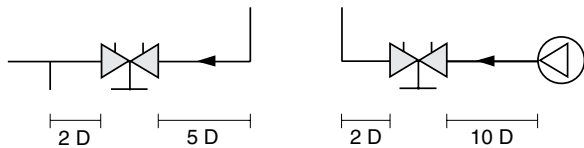


#### TBV-CM NF



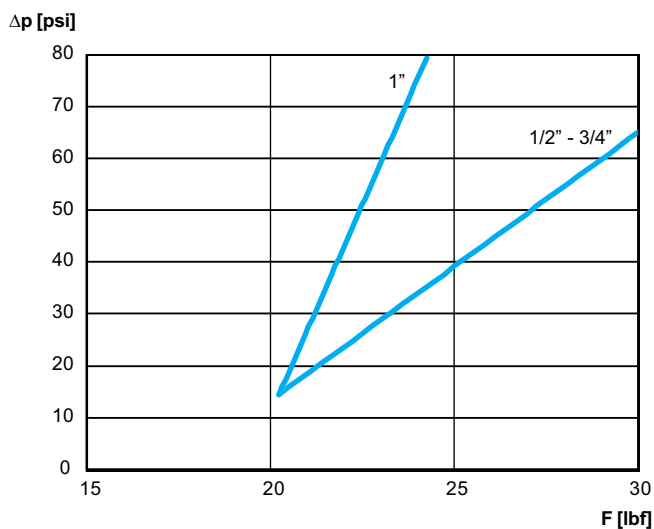
\*) Position

Try to avoid mounting taps and pumps, immediately before the valve.

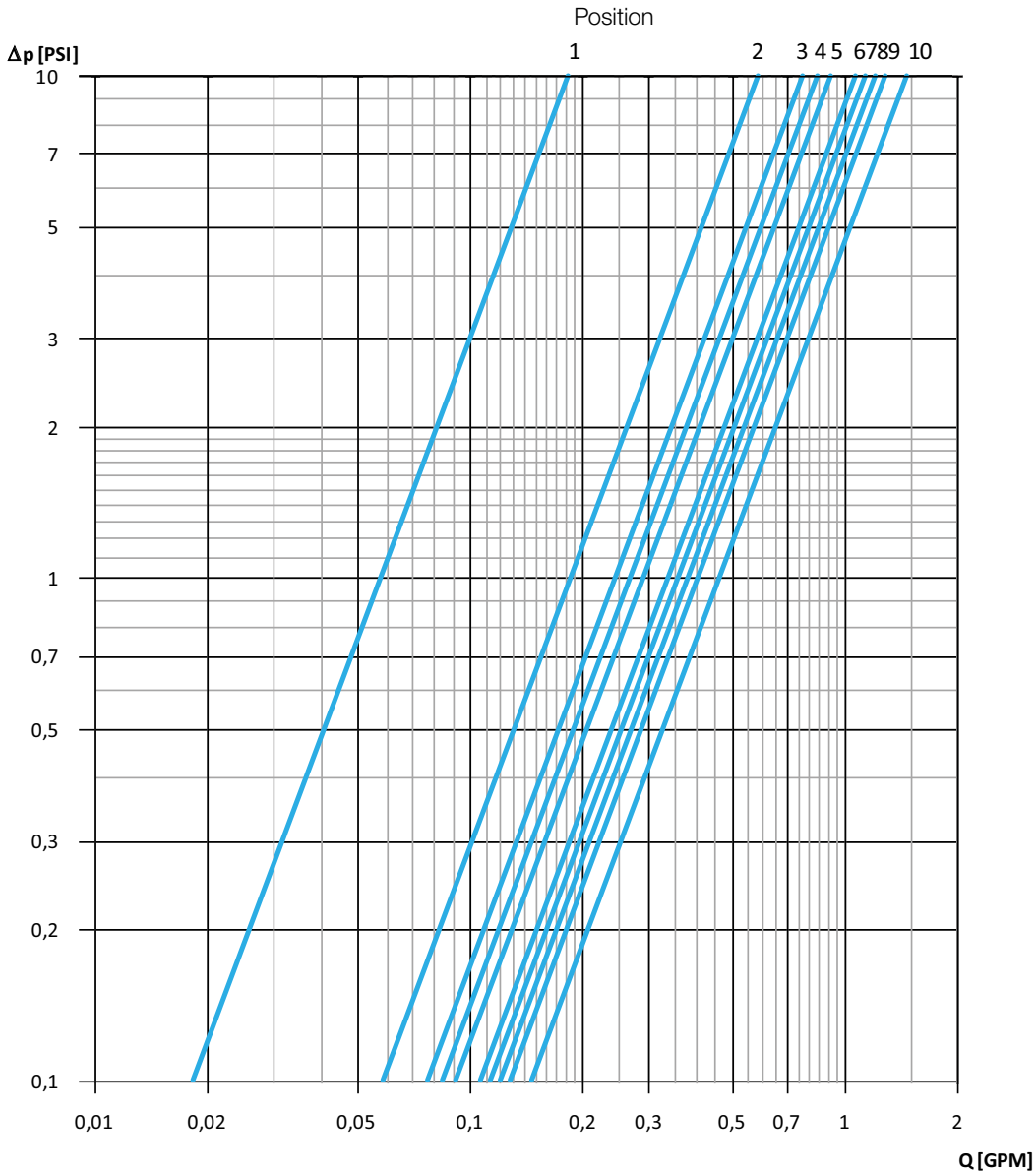


## Closing force

Necessary force (F) to close the valve versus the differential pressure ( $\Delta p$ ).



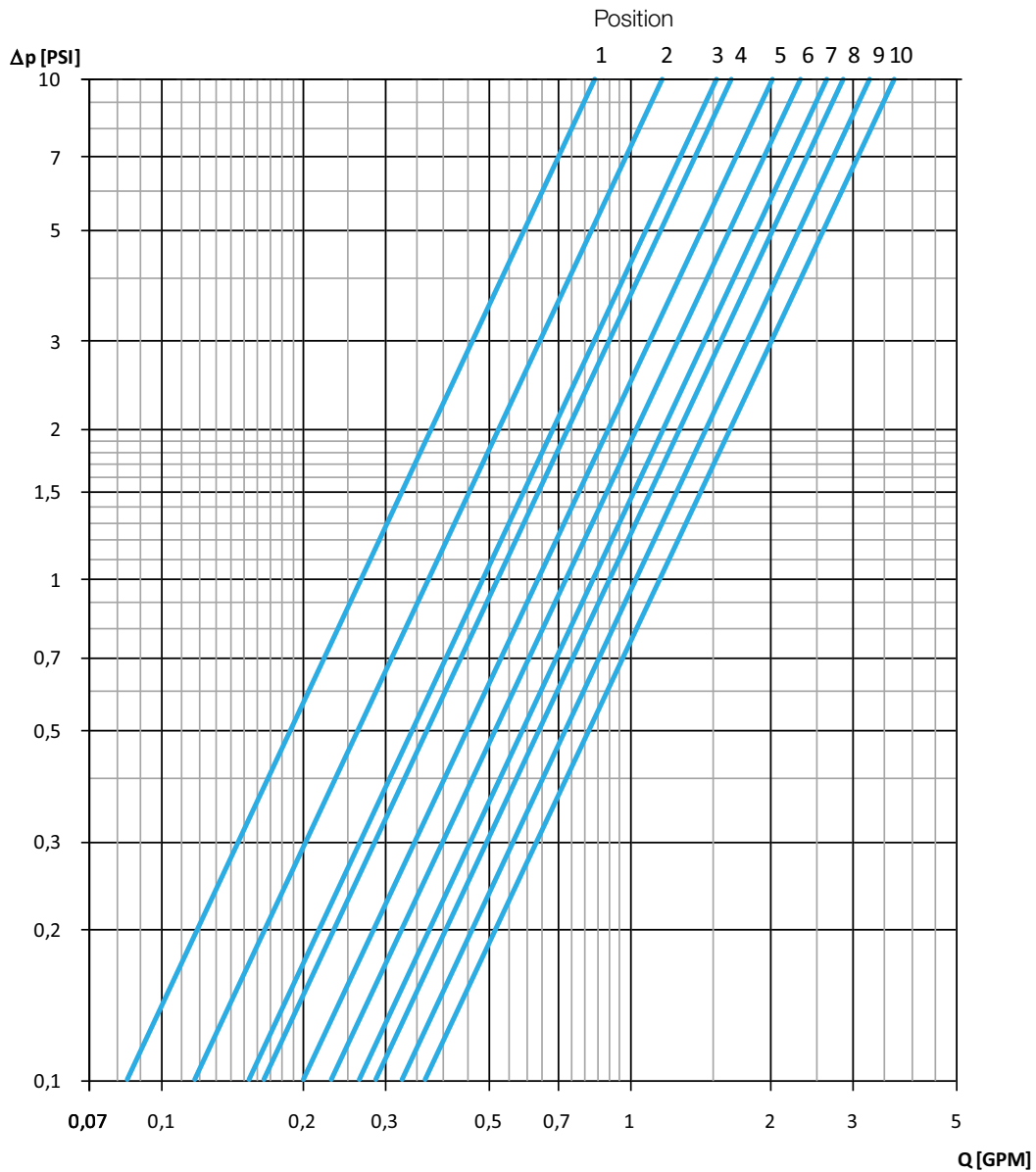
**Diagram TBV-CM LF, size 1/2"**



Position	1	2	3	4	5	6	7	8	9	10
$Cv_{max}$	0.06	0.19	0.24	0.27	0.29	0.34	0.36	0.38	0.41	0.46

$Cv_{max}$  = gpm at a pressure drop of 1 psi at each pre-setting and fully open valve plug.

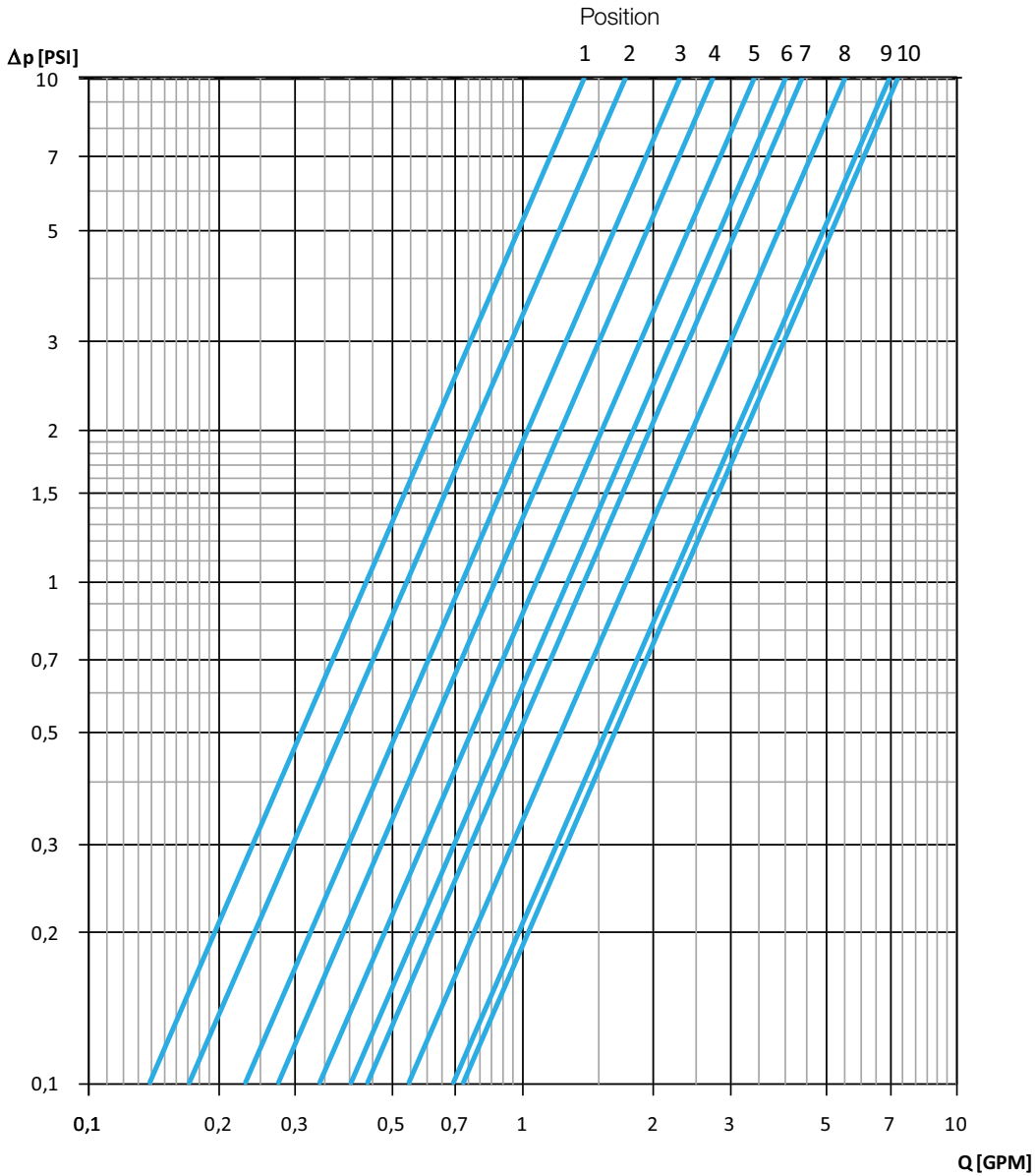
## Diagram TBV-CM NF, size 1/2"



Position	1	2	3	4	5	6	7	8	9	10
$Cv_{max}$	0.27	0.37	0.49	0.52	0.64	0.73	0.84	0.90	1.03	1.16

$Cv_{max}$  = gpm at a pressure drop of 1 psi at each pre-setting and fully open valve plug.

**Diagram TBV-CM NF, size 3/4"**

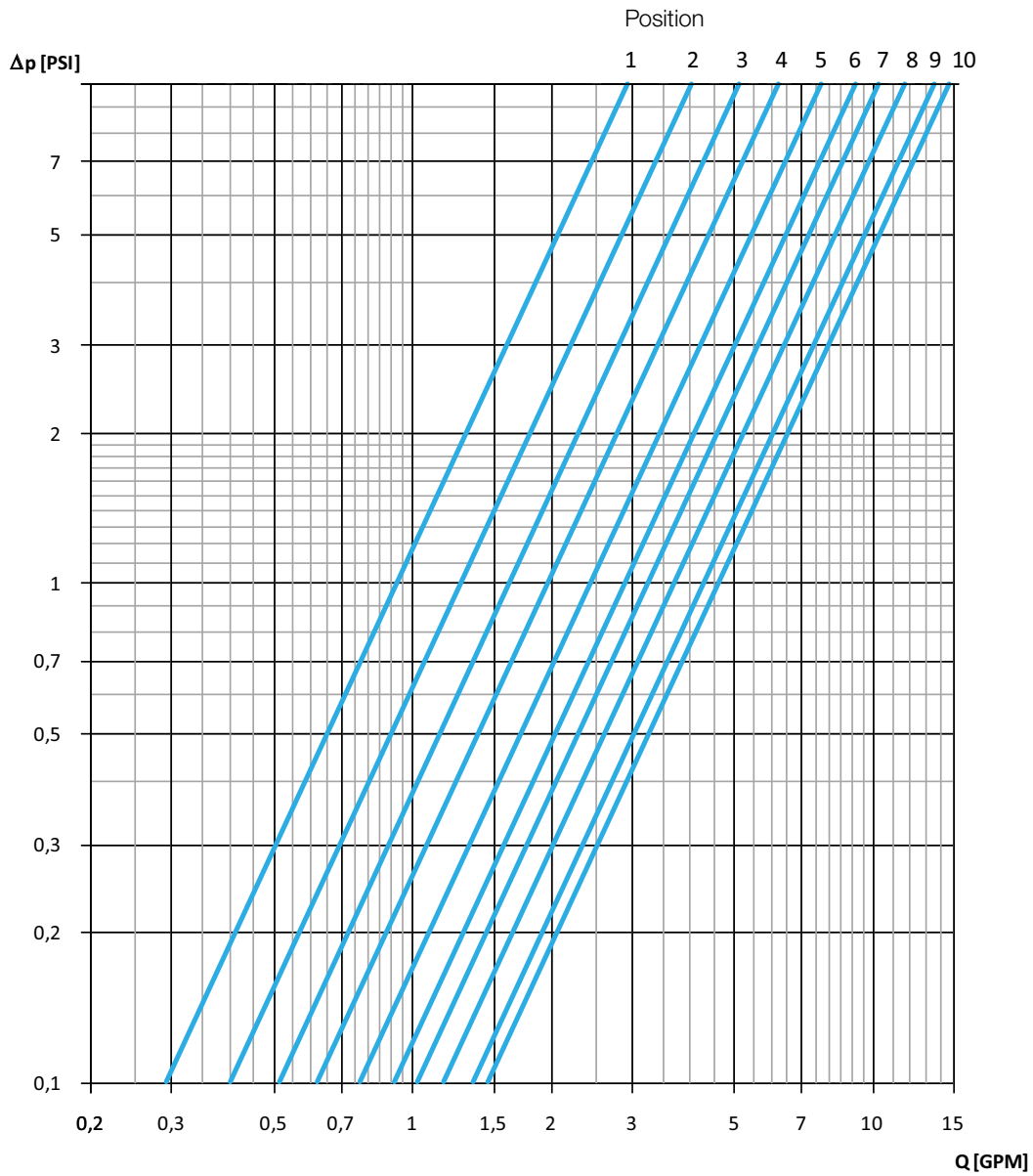


Position	1	2	3	4	5	6	7	8	9	10
Cv <sub>max</sub>	0.44	0.55	0.73	0.87	1.08	1.28	1.39	1.74	2.20	2.32

Cv<sub>max</sub> = gpm at a pressure drop of 1 psi at each pre-setting and fully open valve plug.



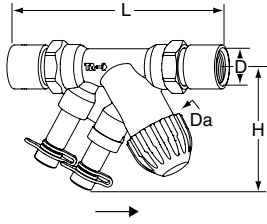
## Diagram TBV-CM NF, size 1"



Position	1	2	3	4	5	6	7	8	9	10
$Cv_{max}$	0.93	1.28	1.62	1.97	2.44	2.90	3.25	3.71	4.29	4.64

$Cv_{max}$  = gpm at a pressure drop of 1 psi at each pre-setting and fully open valve plug.

## Articles



### Female thread

Size	(DN)	D	Da*	L [in]	H [in]	Cvs	lb	Article No ** North America	Article No International
<b>TBV-CM LF, low flow</b>									
1/2"	15	1/2 NPT	M30x1,5	5.04	2.28	0.46	1.08	52 143-715	52 143-515
<b>TBV-CM NF, normal flow</b>									
1/2"	15	1/2 NPT	M30x1,5	5.07	2.28	1.16	1.15	52 144-715	52 144-515
3/4"	20	3/4 NPT	M30x1,5	5.47	2.24	2.32	1.41	52 144-720	52 144-520
1"	25	1 NPT	M30x1,5	6.46	2.52	4.64	2.18	52 144-725	52 144-525

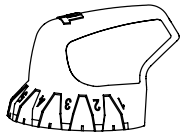
\*) Connection to actuator.

\*\*) Distributed by Victaulic.

Cvs = gpm at a pressure drop of 1 psi and fully open valve.

→ = Flow direction

## Accessories

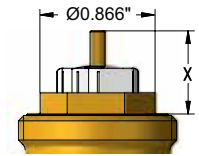


### Presetting tool

For TBV-C, TBV-CM

Article No

52 133-100



### Actuator EMO TM

For more details of EMO TM, see separate catalogue leaflet.

TBV-CM is developed to work together with the EMO TM actuator. Actuators of other brands require a working range of:

X = 0.45" - 0.62" (closed - fully open)

IMI Hydronic Engineering will not be held responsible for the control function if other brands of actuator are used.



