IMI TA

# STAF-SG –

## ANSI flanges

## Balancing valves

Size 3/4” - 16”

IMI Hydronic Engineering

Breakthrough Engineering

# STAF-SG –
## ANSI flanges

A flanged, ductile iron balancing valve that delivers accurate hydronic performance in an impressive range of applications. The STAF-SG is ideal for use mainly on the secondary side in heating and cooling systems.

## Key features

- **Handwheel**
  Equipped with a digital read-out, the handwheel ensures accurate and straightforward balancing.
- **Self-sealing measuring points**
  For simple, accurate balancing.
- **Positive shut-off function**
  For easy maintenance.

## Technical description

**Application:**
Heating (not steam) and cooling systems

**Functions:**
Balancing
Pre-setting
Measuring
Shut-off (The restriction cone for valve sizes 2 1/2" - 16" is pressure released).

**Dimensions:**
3/4" - 16"

**Pressure class:**
Class 150

| Temperature [°F] | Max. pressure [psi] |
|---|---|
| 14 to 100 | 250 |
| 200 | 235 |
| 248 | 225 |

**Temperature:**
Max. working temperature: 248°F
Min. working temperature: 14°F

**Media:**
Water or neutral fluids, water-glycol mixtures (0-57%).

**Material:**
Body: Ductile iron, EN-GJS-400-15 (~ ASTM A536 Grade 60-40-18. ISO 1083 Grade 400-15).

Size 3/4" - 6":
Bonnet, cone and spindle of AMETAL®.
Size 8" - 12":
Bonnet and cone of ductile iron EN-GJS-400-15, and spindle of AMETAL®.
Size 14" - 16":
Bonnet of ductile iron EN-GJS-400-15, cone of silicon brass CuZn16Si4-C (EN 1982) and gunmetal CuSn5Zn5Pb5 (EN 1982), and spindle of AMETAL®.

Cone sizes 2 1/2" - 16": PTFE coated.

Seals: EPDM.
Slip washer: PTFE.
Bonnet bolts: Surface treated steel.
Measuring points: AMETAL® and EPDM.
Handwheel: Size 3/4"-2" polyamide and TPE, size 2 1/2"-6" polyamide, size 8"-16" aluminium.

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

**Surface treatment:**
Size 3/4" - 8": Epoxy painting.
Size 10" - 16": Duasolid painting.

**Marking:**
Size 3/4" - 2": TA, PN, DN (mm), 400-15 (material) and flow direction arrow.
Size 2 1/2" - 16": TA, Class 150, size (inch), 60-40-18 (material), casting date and flow direction arrow.
CE-marking:
CE: STAF-SG (Class 150) size 2 1/2" - 6".
CE 0409*: STAF-SG (Class 150) size 8" - 12".
*) Notified body.

**Flanges:**
Size 3/4" - 2": ISO 7005-2 and EN 1092-2. Bolt circle according to Class 150 ASME/ANSI B16.42.
Size 2 1/2" - 16": Class 150 ASME/ANSI B16.42 (~ PN 20 according to ISO 7005-2).

**Face to face:**
According to ISO 5752 series 1 and EN 558-1 series 1.

## Measuring points

Measuring points are self-sealed. Remove the cap and insert the probe through the seal.

## Sizing

When Δp and the design flow are known, use the formula to calculate the Cv value or use the diagram.

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

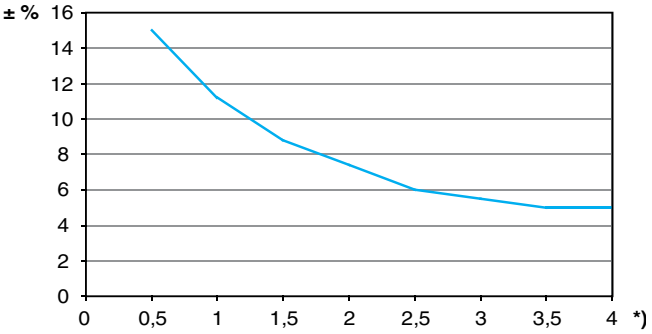
$$Cv = \frac{q}{\sqrt{\Delta p}}$$ q in GPM, Δp in psi

## Measuring accuracy

The handwheel zero position is calibrated and must not be changed.

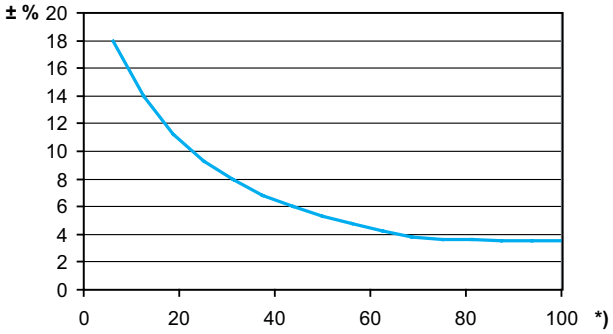
**Deviation of flow at different settings**
The curve holds for valves with the correct flow direction, straight pipe distances (Fig. 1) and normal pipe fittings.

**Size 3/4" - 2"**



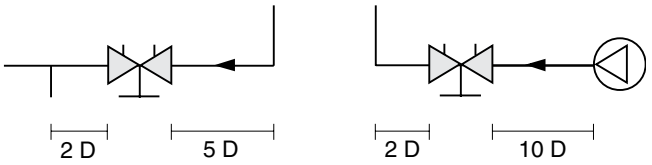

*) Setting, No. of turns.

**Size 2 1/2" - 16"**




*) Setting (%) of fully open valve.

**Fig. 1**




D = Valve size

## Correction factors

The flow calculations are valid for water (68°F). For other liquids with approximately the same viscosity as water (≤20 cSt = 3°E=100S.U.), it is only necessary to compensate for the specific density. However, at low temperatures, the viscosity increases and laminar flow may occur in the valves. This causes a flow deviation that increases with small valves, low settings and low differential pressures. Correction for this deviation can be made with the software HySelect or directly in our balancing instruments.

## Cv values

### Size 3/4" - 2"

| Turns | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" |
|---|---|---|---|---|---|
| **0.5** | 0.593 | 0.696 | 1.32 | 2.03 | 2.97 |
| **1** | 0.878 | 1.19 | 2.20 | 3.83 | 4.87 |
| **1.5** | 1.38 | 2.44 | 3.60 | 5.34 | 8.35 |
| | | | | | |
| **2** | 2.20 | 4.20 | 5.41 | 7.08 | 13.6 |
| **2.5** | 3.25 | 6.15 | 8.24 | 10.2 | 18.8 |
| **3** | 4.49 | 8.00 | 11.0 | 14.6 | 24.9 |
| | | | | | |
| **3.5** | 5.51 | 9.28 | 13.7 | 18.6 | 30.7 |
| **4** | 6.61 | 10.1 | 16.5 | 22.3 | 38.3 |

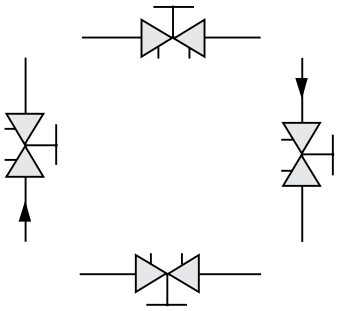
### Size 2 1/2" - 6"

| Turns | 2 1/2" | 3" | 4" | 5" | 6" |
|---|---|---|---|---|---|
| **0.5** | 2.09 | 2.32 | 2.9 | 6.38 | 7.54 |
| **1** | 3.94 | 4.64 | 6.96 | 12.2 | 13.9 |
| **1.5** | 5.68 | 6.96 | 10.4 | 18.0 | 25.5 |
| | | | | | |
| **2** | 7.54 | 9.28 | 13.3 | 24.9 | 46.4 |
| **2.5** | 10.8 | 12.8 | 18.6 | 31.3 | 75.4 |
| **3** | 18.9 | 16.2 | 30.2 | 41.8 | 116 |
| | | | | | |
| **3.5** | 29.7 | 22.6 | 51.0 | 63.8 | 157 |
| **4** | 40.9 | 33.6 | 73.1 | 96.3 | 196 |
| **4.5** | 51.6 | 47.6 | 92.8 | 132 | 240 |
| | | | | | |
| **5** | 60.3 | 63.8 | 114 | 164 | 281 |
| **5.5** | 70.2 | 78.9 | 133 | 194 | 324 |
| **6** | 78.9 | 92.8 | 153 | 229 | 362 |
| | | | | | |
| **6.5** | 84.7 | 107 | 168 | 255 | 394 |
| **7** | 89.3 | 119 | 184 | 289 | 426 |
| **7.5** | 93.4 | 131 | 203 | 320 | 454 |
| | | | | | |
| **8** | 98.6 | 139 | 220 | 348 | 487 |

**Size 8” - 16”**

| Turns | 8” | 10” | 12” | 14” | 16” |
|---|---|---|---|---|---|
| **0.5** | - | - | - | - | - |
| **1** | - | - | - | - | - |
| **1.5** | - | - | - | - | - |
| | | | | | |
| **2** | 46.4 | 104 | - | - | - |
| **2.5** | 58.0 | 128 | - | - | - |
| **3** | 75.4 | 162 | 174 | 126 | 145 |
| | | | | | |
| **3.5** | 104 | 226 | 267 | 150 | 172 |
| **4** | 139 | 296 | 348 | 172 | 198 |
| **4.5** | 191 | 371 | 429 | 197 | 241 |
| | | | | | |
| **5** | 261 | 447 | 522 | 240 | 306 |
| **5.5** | 331 | 516 | 621 | 295 | 378 |
| **6** | 394 | 580 | 719 | 350 | 448 |
| | | | | | |
| **6.5** | 464 | 632 | 800 | 408 | 521 |
| **7** | 505 | 684 | 870 | 469 | 597 |
| **7.5** | 545 | 766 | 945 | 546 | 684 |
| | | | | | |
| **8** | 597 | 841 | 1032 | 645 | 789 |
| **9** | 690 | 951 | 1125 | 909 | 1037 |
| **10** | 754 | 1090 | 1206 | 1110 | 1322 |
| | | | | | |
| **11** | 824 | 1218 | 1299 | 1276 | 1450 |
| **12** | 887 | 1375 | 1392 | 1462 | 1624 |
| **13** | - | - | 1531 | 1647 | 1810 |
| | | | | | |
| **14** | - | - | 1589 | 1868 | 2007 |
| **15** | - | - | 1624 | 2042 | 2250 |
| **16** | - | - | 1682 | 2169 | 2482 |
| | | | | | |
| **17** | - | - | - | 2274 | 2645 |
| **18** | - | - | - | 2366 | 2796 |
| **19** | - | - | - | 2471 | 2935 |
| | | | | | |
| **20** | - | - | - | 2552 | 3051 |
| **21** | - | - | - | - | 3144 |
| **22** | - | - | - | - | 3225 |

## Installation



## Setting

It is possible to read the set value on the handwheel.
The number of turns between the fully open and closed positions is:
4 turns for 3/4" - 2",
8 turns for 2 1/2" - 6",
12 turns for 8" - 10",
16 turns for 12",
20 turns for 14" and
22 turns for 16".

Initial setting of a valve for a particular pressure drop, e g corresponding to 2.3 turns on the graph, is carried out as follows:

1. Close the valve fully (Fig 1)
2. Open the valve to 2.3 turns (Fig. 2).
3. Using an Allen key, turn the inner spindle clockwise until the stop position.
4. The valve is now set.

To check the setting of a valve, first close the valve, then open it to the stop position; the indicator then shows the presetting number, in this case 2.3 (Fig. 2).

**Example size 2 1/2"**
**Fig. 1** Valve closed

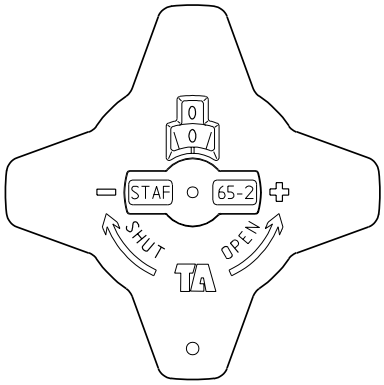
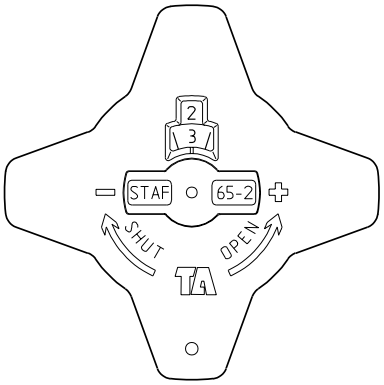



**Fig. 2** The valve is set at 2.3




**Example size 8"**
**Fig. 1** Valve closed

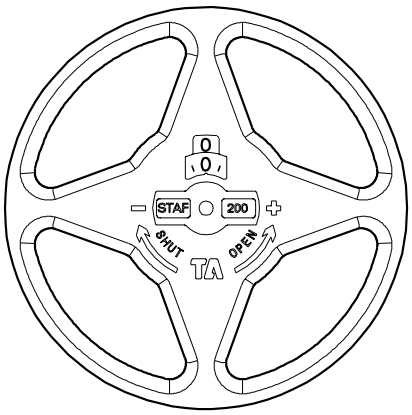
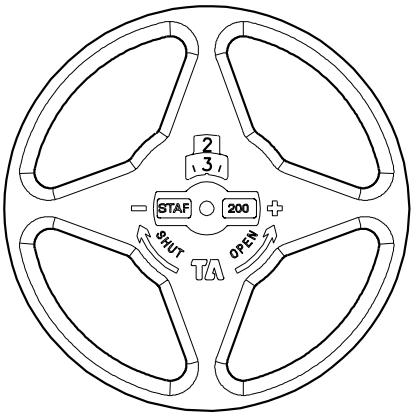



**Fig. 2** The valve is set at 2.3



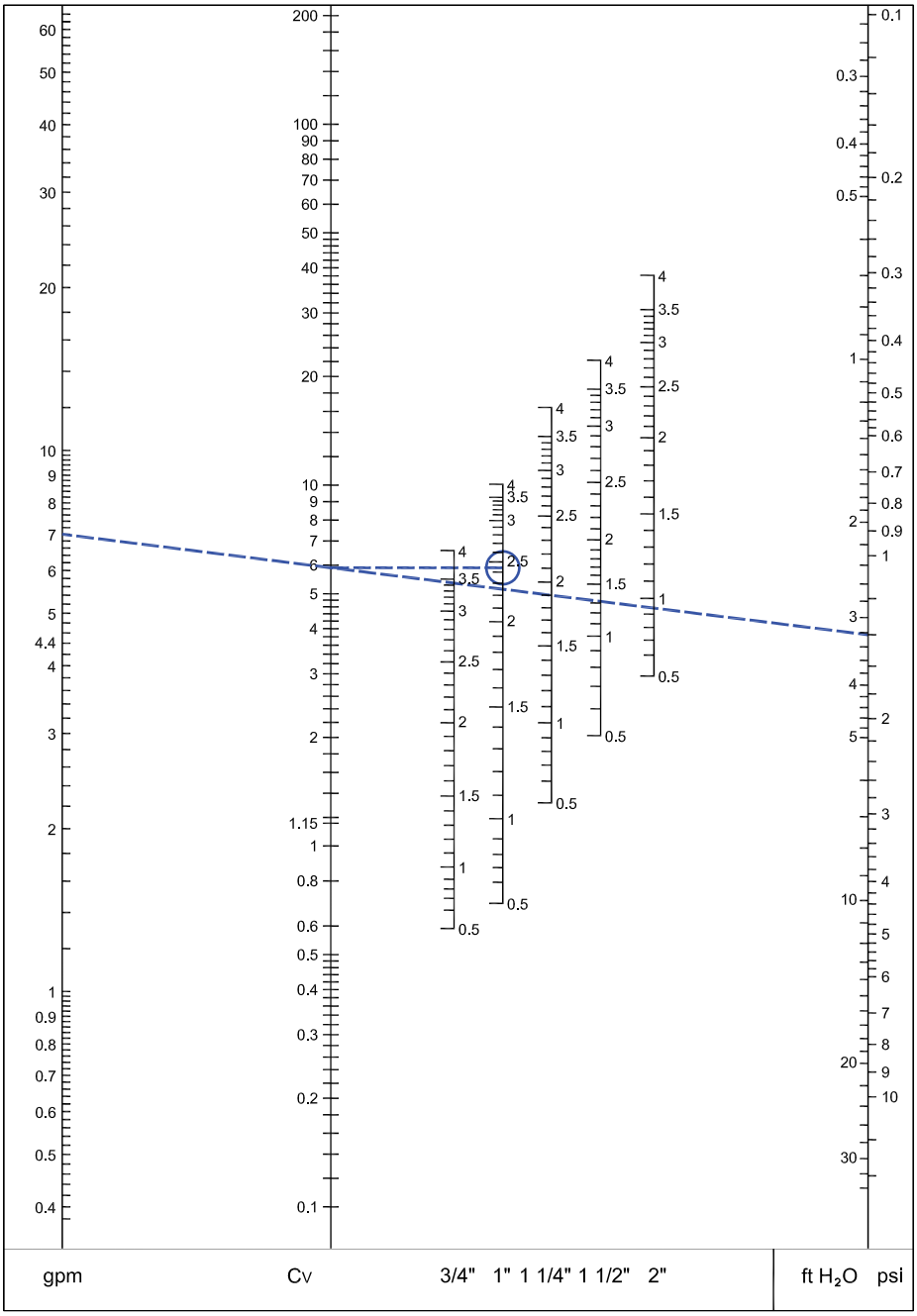
## Diagram example

**Wanted:**
Presetting for size 1” at a desired flow rate of 7 gpm and a pressure drop of 1.4 psi.

**Solution:**
Draw a straight line joining 7 gpm and 1.4 psi. This gives Cv = 6. Now draw a horizontal line from Cv = 6.
This intersects the bar for size 1” at the desired presetting of 2.45 turns.

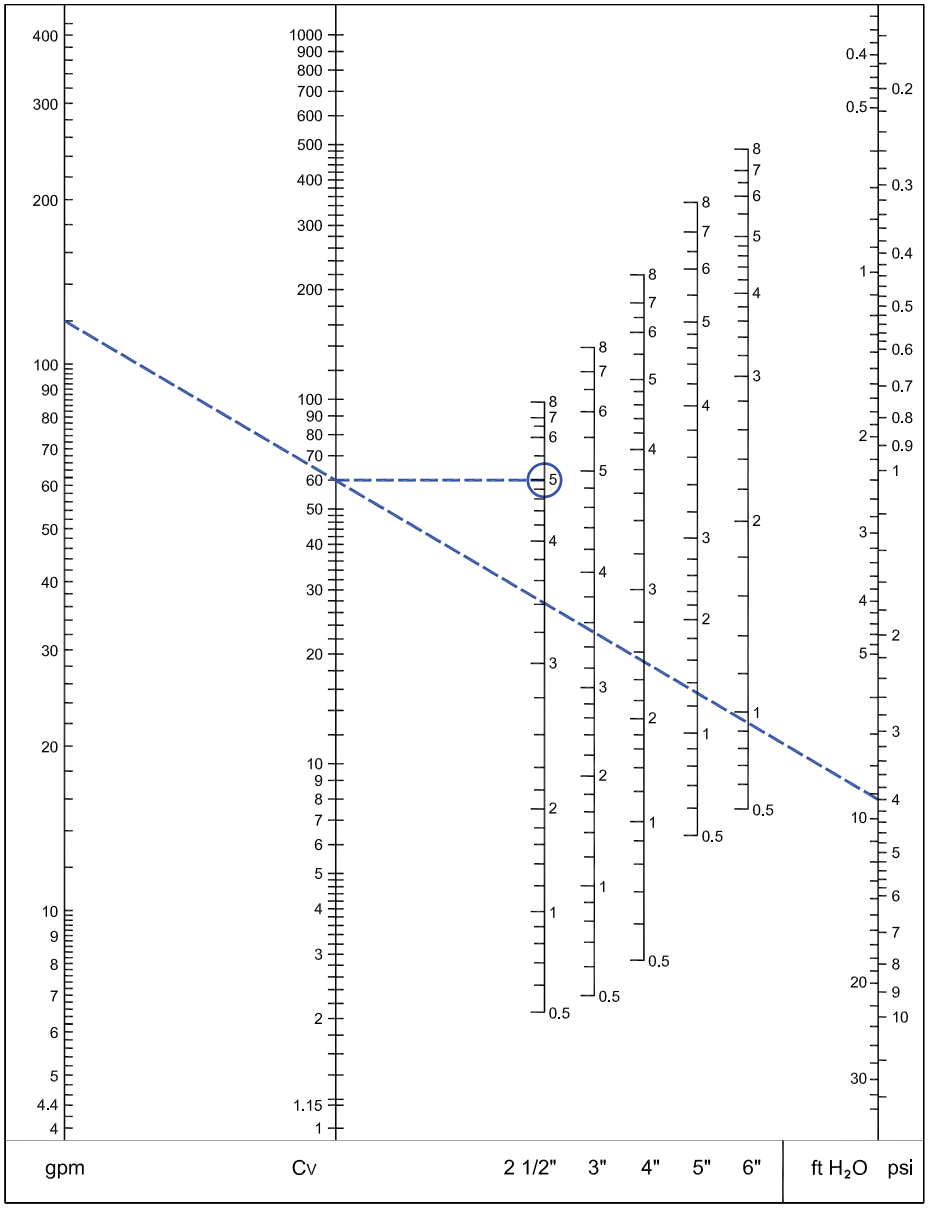
**NOTE:**
If the flow rate falls outside the scale in the diagram, the reading can be made as follows: Starting with the example above, we get 1.4 psi, Cv = 6 and flowrate 7 gpm. At 1.4 psi and Cv = 0.6 we get the flow-rate 0.7 gpm, and at Cv = 60, we get 70 gpm. That is, for a given pressure drop, it is possible to read 0.1 times or 10 times the flow and Cv-values.

## Diagram size 3/4” - 2”



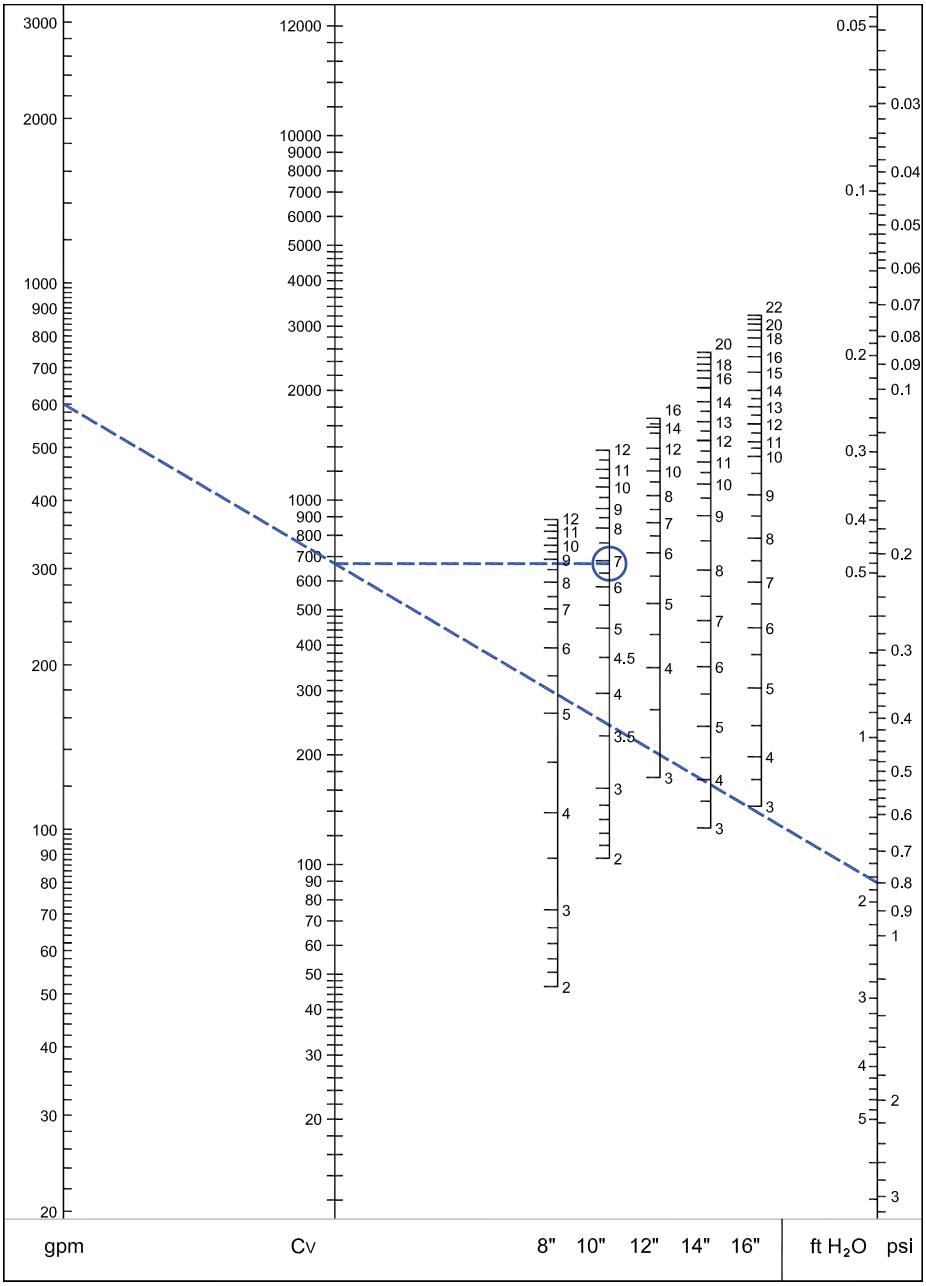

Recommended area: See Fig. 3 under “Measuring accuracy”.

## Diagram size 2 1/2” - 6”



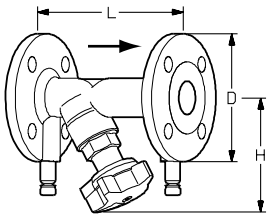

Recommended area: See Fig. 3 under “Measuring accuracy”.

## Diagram size 8” - 16”



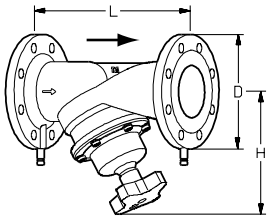

Recommended area: See Fig. 3 under “Measuring accuracy”.

## Articles



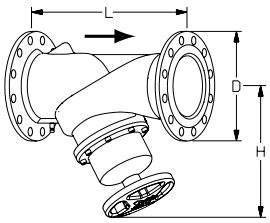

### Threaded bonnet

| Size | Number of bolt holes | L [in] | H [in] | D [in] | Cvs | lb | Article No ** North America | Article No International |
|---|---|---|---|---|---|---|---|---|
| 3/4” | 4 | 5.91 | 3.94 | 4.13 | 6.61 | 5.1 | – | 52 182-920 |
| 1” | 4 | 6.30 | 4.29 | 4.53 | 10.1 | 6.4 | – | 52 182-925 |
| 1 1/4” | 4 | 7.09 | 4.37 | 5.51 | 16.5 | 9.5 | – | 52 182-932 |
| 1 1/2” | 4 | 7.87 | 4.80 | 5.91 | 22.3 | 11.5 | – | 52 182-940 |
| 2” | 4 | 9.06 | 4.80 | 6.50 | 38.3 | 15 | – | 52 182-950 |




### Bolted bonnet

| Size | Number of bolt holes | L [in] | H [in] | D [in] | Cvs | lb | Article No ** North America | Article No International |
|---|---|---|---|---|---|---|---|---|
| 2 1/2” | 4 | 11.42 | 8.07 | 7.09 | 98.6 | 24.3 | 52 167-965 | 52 182-965 |
| 3” | 4 | 12.20 | 8.66 | 7.48 | 139 | 30.9 | 52 167-980 | 52 182-980 |
| 4” | 8 | 13.78 | 9.45 | 9.06 | 220 | 43.2 | 52 167-990 | 52 182-990 |
| 5” | 8 | 15.75 | 10.83 | 10.04 | 348 | 61.9 | 52 167-991 | 52 182-991 |
| 6” | 8 | 18.90 | 11.22 | 11.02 | 487 | 81.8 | 52 167-992 | 52 182-992 |




### Bolted bonnet

Measuring points on body

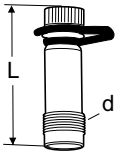
| Size | Number of bolt holes | L [in] | H [in] | D [in] | Cvs | lb | Article No ** North America | Article No International |
|---|---|---|---|---|---|---|---|---|
| 8” | 8 | 23.62 | 16.93 | 13.58 | 887 | 167.5 | 52 167-993 | 52 182-993 |
| 10” | 12 | 28.74 | 16.54 | 15.98 | 1375 | 269.0 | 52 167-994 | 52 182-994 |
| 12” | 12 | 33.46 | 18.90 | 19.02 | 1682 | 359.4 | 52 167-995 | 52 182-995 |
| 14” * | 12 | 38.58 | 23.03 | 20.98 | 2552 | 654.8 | 52 182-996 * | 52 182-996 * |
| 16” * | 16 | 43.31 | 25.20 | 23.50 | 3225 | 895.1 | 52 182-997 * | 52 182-997 * |

*) **NOTE:** Not CE marked products. Not allowed to be installed in EU or EFTA countries
**) Distributed by Victaulic.

→ = Flow direction

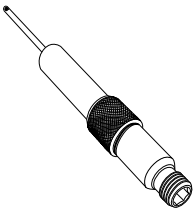
Cvs = gpm at a pressure drop of 1 psi and fully open valve.

## Accessories



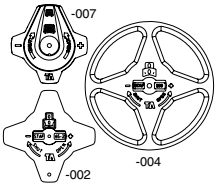

### Measuring point
AMETAL®/EPDM

| d | L [in] | Article No |
|---|---|---|
| **Size 3/4” - 2”** | | |
| R1/4 | 1.535 | 52 179-009 |
| R1/4 | 4.055 | 52 179-609 |
| **Size 2 1/2” - 16”** | | |
| R3/8 | 1.772 | 52 179-008 |
| R3/8 | 3.976 | 52 179-608 |



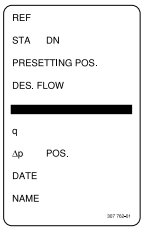
### Measuring point
Extensions 2.36 in.
Can be installed without draining of the system.
AMETAL®/Stainless steel/EPDM

| | Article No |
|---|---|
| | 52 179-006 |




### Handwheel
Complete

| Size | Article No |
|---|---|
| 3/4” - 2” | 52 186-007 |
| 2 1/2” - 6” | 52 186-002 |
| 8” - 16” | 52 186-004 |

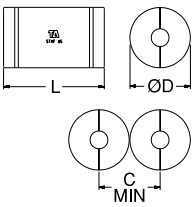



### Identification tag

| | Article No |
|---|---|
| | 52 161-990 |

### Allen key
For locking of setting.

| [mm] | For size | Article No |
|---|---|---|
| 3 | 3/4” - 6” | 52 187-103 |
| 5 | 8 “- 16” | 52 187-105 |




### Insulation
For heating/cooling
CFC-free polyurethane. Covered with grey PVC.
See catalogue leaflet “Prefab insulations” for complete details.

| For size | L [in] | D [in] | C [in] | Article No |
|---|---|---|---|---|
| 2” | 15.4 | 9.84 | 9.91 | 52 189-850 |
| 2 1/2” | 17.7 | 10.6 | 10.7 | 52 189-865 |
| 3” | 18.9 | 11.4 | 11.5 | 52 189-880 |
| 4” | 20.5 | 12.6 | 12.7 | 52 189-890 |
| 5” | 22.4 | 13.8 | 13.9 | 52 189-891 |
| 6” | 26.0 | 15.0 | 15.0 | 52 189-892 |