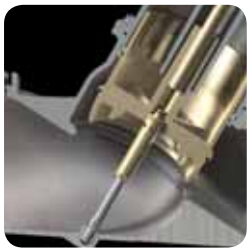
## BALANCING VALVES

**BALANCING VALVE – PN 16 AND PN 25 – DN 20-400**
*A flanged, cast iron (STAF) and ductile iron (STAF-SG) balancing valve that delivers accurate hydronic performance in an impressive range of applications.*
*The STAF/STAF-SG is ideal for use mainly on the secondary side in heating and cooling systems.*

**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

**Applications:**
Heating and cooling systems

**Functions:**
Balancing
Pre-setting
Measuring
Shut-off (The balancing cone for valve DN 65-400 is pressure released).

**Dimensions:**
STAF: DN 65-150
STAF-SG: DN 20-400

**Pressure class:**
STAF: PN 16
STAF-SG: PN 16 and PN 25 (see each product)

**Temperature:**
Max. working temperature: 120°C
For higher temperatures (max. 150°C), please contact the nearest sales office.
Min. working temperature:
STAF: -10°C
STAF-SG: -20°C

**Material:**
Body, STAF: Cast iron EN-GJL-250 (GG 25).
Body, STAF-SG: Ductile iron EN-GJS-400-15.
DN 20-150: Bonnet, restriction cone and spindle of AMETAL®.
DN 200-300: Bonnet of ductile iron, cone of Bronze and spindle of AMETAL®.
DN 350-400: Bonnet of ductile iron, cone of silicon brass CuZn16Si4-C (EN 1982) or brass CuZn35Pb2Al-C-GS (EN 1982) and spindle of AMETAL®.
Seat seal: Cone with EPDM ring.
Bonnet bolts: Chromed steel.
Handwheel: DN 20-150 polyamide, DN 200-400 aluminium.

AMETAL® is the dezincification resistant alloy of TA.

**Surface treatment:**
DN 20-200: Epoxy painting.
DN 250-400: Duasolid painting.

**Marking:**
Body: TA, PN, DN, flow direction arrow, material and casting date (year, month, day).
CE-marking according to table:

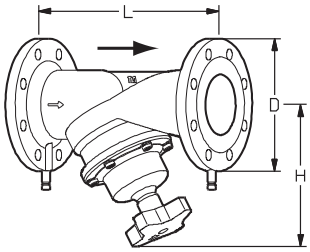
| Marking | STAF | STAF-SG (PN 16) | STAF-SG (PN 25) |
|---|---|---|---|
| CE<br>CE 0409* | DN 65-150 | DN 200<br>DN 250-400 | DN 50-125<br>DN 150-400 |

*) Notified body.

**Face to face length:**
ISO 5752 series 1, BS 2080 and EN 558-1 series 1.

## STAF – CAST IRON

### Bolted bonnet

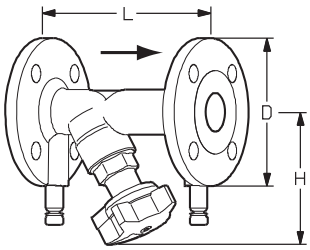



**PN 16, ISO 7005-2, EN 1092-2**

| TA No | EAN | DN | Number of bolt holes | D | L | H | Kvs | Kg |
|---|---|---|---|---|---|---|---|---|
| 52 181-065 | 7318792823305 | 65-2 | 4 | 185 | 290 | 205 | 85 | 12.4 |
| 52 181-080 | 7318792823404 | 80 | 8 | 200 | 310 | 220 | 120 | 15.9 |
| 52 181-090 | 7318792823503 | 100 | 8 | 220 | 350 | 240 | 190 | 22 |
| 52 181-091 | 7318792823602 | 125 | 8 | 250 | 400 | 275 | 300 | 32.7 |
| 52 181-092 | 7318792823701 | 150 | 8 | 285 | 480 | 285 | 420 | 42.4 |

## STAF-SG – DUCTILE IRON

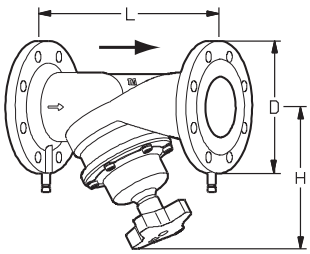
### Threaded bonnet




**PN 25, ISO 7005-2, EN 1092-2** (DN 20-50 also fit PN 16 flanges)

| TA No | EAN | DN | Number of bolt holes | D | L | H | Kvs | Kg |
|---|---|---|---|---|---|---|---|---|
| 52 182-020 | 7318792825705 | 20 | 4 | 105 | 150 | 100 | 5.7 | 2.3 |
| 52 182-025 | 7318792825804 | 25 | 4 | 115 | 160 | 109 | 8.7 | 2.9 |
| 52 182-032 | 7318792825903 | 32 | 4 | 140 | 180 | 111 | 14.2 | 4.3 |
| 52 182-040 | 7318792826009 | 40 | 4 | 150 | 200 | 122 | 19.2 | 5.2 |
| 52 182-050 | 7318792826108 | 50 | 4 | 165 | 230 | 122 | 33 | 6.6 |

### Bolted bonnet




**PN 25, ISO 7005-2, EN 1092-2**

| TA No | EAN | DN | Number of bolt holes | D | L | H | Kvs | Kg |
|---|---|---|---|---|---|---|---|---|
| 52 182-065 | 7318792826207 | 65-2 | 8 | 185 | 290 | 205 | 85 | 11 |
| 52 182-080 | 7318792826306 | 80 | 8 | 200 | 310 | 220 | 120 | 14 |
| 52 182-090 | 7318792826405 | 100 | 8 | 235 | 350 | 240 | 190 | 19.6 |
| 52 182-091 | 7318792826504 | 125 | 8 | 270 | 400 | 275 | 300 | 28.1 |
| 52 182-092 | 7318792826603 | 150 | 8 | 300 | 480 | 285 | 420 | 37.1 |

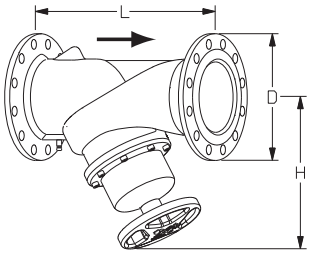
→ = Flow direction
Kvs = $m^3/h$ at a pressure drop of 1 bar and fully open valve.

# STAF, STAF-SG



### Bolted bonnet

Measuring points on body




**PN 16, ISO 7005-2, EN 1092-2**

| TA No | EAN | DN | Number of bolt holes | D | L | H | Kvs | Kg |
|---|---|---|---|---|---|---|---|---|
| 52 181-093 | 7318792823800 | 200 | 12 | 340 | 600 | 430 | 765 | 76 |
| 52 181-094 | 7318792823909 | 250 | 12 | 425 | 730 | 420 | 1185 | 122 |
| 52 181-095 | 7318792824005 | 300 | 12 | 485 | 850 | 480 | 1450 | 163 |
| 52 181-096 | 7318793859402 | 350 | 16 | 520 | 980 | 585 | 2200 | 297 |
| 52 181-097 | 7318793859303 | 400 | 16 | 580 | 1100 | 640 | 2780 | 406 |

**PN 25, ISO 7005-2, EN 1092-2**

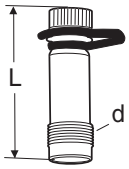
| TA No | EAN | DN | Number of bolt holes | D | L | H | Kvs | Kg |
|---|---|---|---|---|---|---|---|---|
| 52 182-093 | 7318792826702 | 200 | 12 | 360 | 600 | 430 | 765 | 76 |
| 52 182-094 | 7318792826801 | 250 | 12 | 425 | 730 | 420 | 1185 | 122 |
| 52 182-095 | 7318792826900 | 300 | 16 | 485 | 850 | 480 | 1450 | 163 |
| 52 182-096 | 7318793843401 | 350 | 16 | 555 | 980 | 585 | 2200 | 297 |
| 52 182-097 | 7318793843500 | 400 | 16 | 620 | 1100 | 640 | 2780 | 406 |

→ = Flow direction

Kvs = $m^3/h$ at a pressure drop of 1 bar and fully open valve.

## ACCESSORIES

### Measuring points

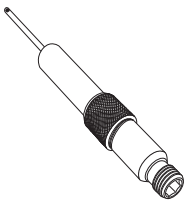



| TA No | EAN | d | L |
|---|---|---|---|
| **- DN 50** | | | |
| 52 179-009 | 7318792813108 | 1/4 | 39 |
| 52 179-609 | 7318792814600 | 1/4 | 103 |
| **DN 65 -** | | | |
| 52 179-008 | 7318792813009 | 3/8 | 47 |
| 52 179-608 | 7318792814501 | 3/8 | 103 |

### Measuring point

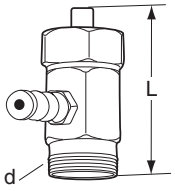
Extensions 60 mm (not for 52 179-000/-601).

Can be installed without draining of the system.



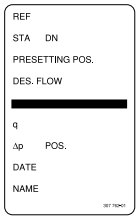
| TA No | EAN |
|---|---|
| 52 179-006 | 7318792812804 |

## Measuring point
max 150°C
+ older STAD et STAF



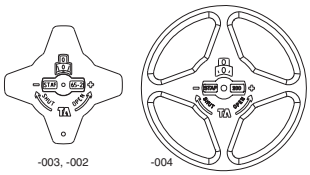

| TA No | EAN | d | L |
|---|---|---|---|
| **- DN 50** | | | |
| 52 179-000 | 7318792812408 | R1/4 | 30 |
| 52 179-601 | 7318792814303 | R1/4 | 90 |
| **DN 65 -** | | | |
| 52 179-007 | 7318792812903 | R3/8 | 30 |
| 52 179-607 | 7318792814402 | R3/8 | 90 |

## Identification tag
Incl 1 pc per valve



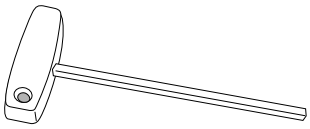

| TA No | EAN |
|---|---|
| 52 161-990 | 7318792779206 |

## Handwheel
Complete



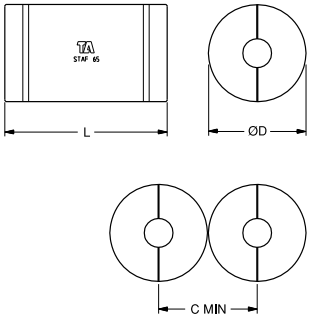

| TA No | EAN | DN |
|---|---|---|
| 52 186-003 | 7318792834905 | 20 - 50 |
| 52 186-002 | 7318792834806 | 65 - 150 |
| 52 186-004 | 7318792835001 | 200 - 400 |

## Allen key



| TA No | EAN | | For DN |
|---|---|---|---|
| 52 187-103 | 7318792836008 | 3 mm | 20 - 50 |
| 52 187-105 | 7318792836107 | 5 mm | 65 - 150 |
| - | | 8 mm | 200 - 400 |

## Insulation
For heating/cooling
See catalogue leaflet Prefab insulations for complete details.




| TA No | EAN | For DN | L | D | C |
|---|---|---|---|---|---|
| 52 189-850 | 7318792840708 | 50 | 390 | 250 | 252 |
| 52 189-865 | 7318792840807 | 65 | 450 | 270 | 272 |
| 52 189-880 | 7318792840906 | 80 | 480 | 290 | 292 |
| 52 189-890 | 7318792841002 | 100 | 520 | 320 | 322 |
| 52 189-891 | 7318792841101 | 125 | 570 | 350 | 352 |
| 52 189-892 | 7318792841200 | 150 | 660 | 380 | 382 |

## MEASURING POINTS

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

## 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 DN 20-50,
8 turns for DN 65-150,
12 turns for DN 200-250,
16 turns for DN 300,
20 turns for DN 350 and
22 turns for DN 400.

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 DN 65**

**Fig. 1** Valve closed

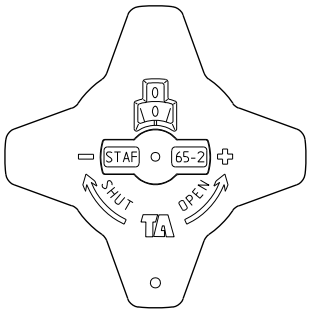
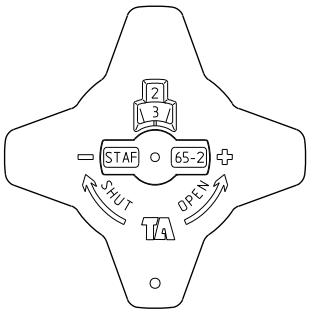



**Fig. 2** The valve is set at 2.3




**Example DN 200**

**Fig. 1** Valve closed

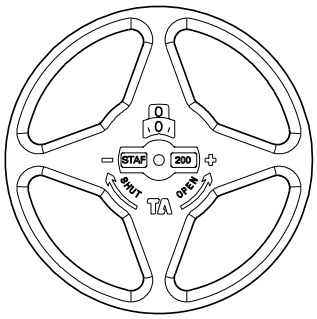
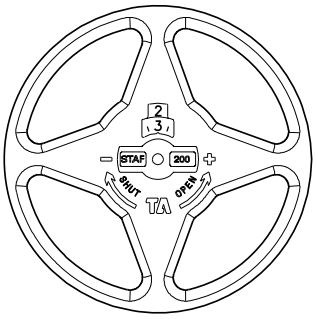



**Fig. 2** The valve is set at 2.3



## MEASURING ACCURACY

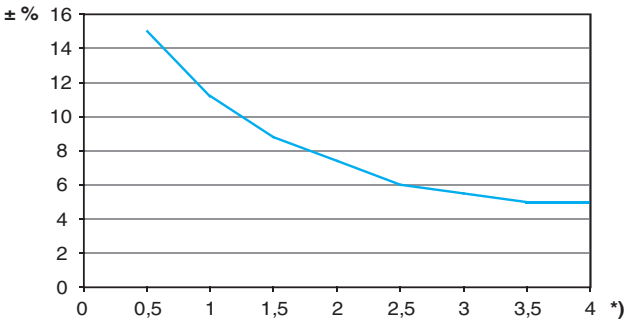
The handwheel zero position is calibrated and must not be changed.

### Deviation of flow at different settings

The curve (Fig. 3) holds for valves with the correct flow direction, straight pipe distances (Fig. 4) and normal pipe fittings.

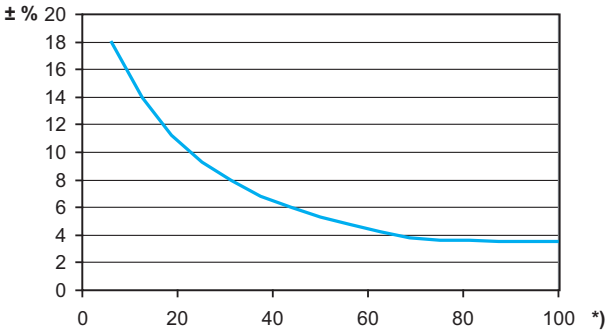
**Fig. 3**

**DN 20-50**



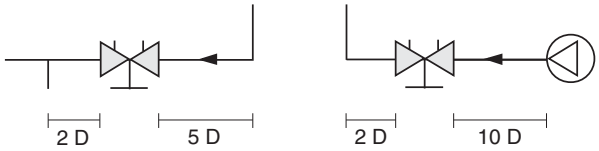

*) Setting, No. of turns.

**DN 65-400**




*) Setting (%) of fully open valve.

**Fig. 4**




## CORRECTION FACTORS

The flow calculations are valid for water (+20°C). 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 TA Select or directly in TA's balancing instruments.

## SIZING

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

$$Kv = 0.01 \frac{q}{\sqrt{\Delta p}}$$ q l/h, Δp kPa

$$Kv = 36 \frac{q}{\sqrt{\Delta p}}$$ q l/s, Δp kPa

## KV VALUES

**DN 20-50**

| Turns | DN 20 | DN 25 | DN 32 | DN 40 | DN 50 |
|---|---|---|---|---|---|
| **0.5** | 0,511 | 0,60 | 1,14 | 1,75 | 2,56 |
| **1** | 0,757 | 1,03 | 1,90 | 3,30 | 4,2 |
| **1.5** | 1,19 | 2,10 | 3,10 | 4,60 | 7,2 |
| **2** | 1,90 | 3,62 | 4,66 | 6,10 | 11,7 |
| **2.5** | 2,80 | 5,30 | 7,10 | 8,80 | 16,2 |
| **3** | 3,87 | 6,90 | 9,50 | 12,6 | 21,5 |
| **3.5** | 4,75 | 8,00 | 11,8 | 16,0 | 26,5 |
| **4** | 5,70 | 8,70 | 14,2 | 19,2 | 33 |

**DN 65-150**

| Turns | DN 65-2 | DN 80 | DN 100 | DN 125 | DN 150 |
|---|---|---|---|---|---|
| **0.5** | 1,8 | 2 | 2,5 | 5,5 | 6,5 |
| **1** | 3,4 | 4 | 6 | 10,5 | 12 |
| **1.5** | 4,9 | 6 | 9 | 15,5 | 22 |
| **2** | 6,5 | 8 | 11,5 | 21,5 | 40 |
| **2.5** | 9,3 | 11 | 16 | 27 | 65 |
| **3** | 16,3 | 14 | 26 | 36 | 100 |
| **3.5** | 25,6 | 19,5 | 44 | 55 | 135 |
| **4** | 35,3 | 29 | 63 | 83 | 169 |
| **4.5** | 44,5 | 41 | 80 | 114 | 207 |
| **5** | 52 | 55 | 98 | 141 | 242 |
| **5.5** | 60,5 | 68 | 115 | 167 | 279 |
| **6** | 68 | 80 | 132 | 197 | 312 |
| **6.5** | 73 | 92 | 145 | 220 | 340 |
| **7** | 77 | 103 | 159 | 249 | 367 |
| **7.5** | 80,5 | 113 | 175 | 276 | 391 |
| **8** | 85 | 120 | 190 | 300 | 420 |

**DN 200-400**

| Turns | DN 200 | DN 250 | DN 300 | DN 350 | DN 400 |
|---|---|---|---|---|---|
| **0.5** | - | - | - | - | - |
| **1** | - | - | - | - | - |
| **1.5** | - | - | - | - | - |
| **2** | 40 | 90 | - | - | - |
| **2.5** | 50 | 110 | - | - | - |
| **3** | 65 | 140 | 150 | 109 | 125 |
| **3.5** | 90 | 195 | 230 | 129 | 148 |
| **4** | 120 | 255 | 300 | 148 | 171 |
| **4.5** | 165 | 320 | 370 | 170 | 208 |
| **5** | 225 | 385 | 450 | 207 | 264 |
| **5.5** | 285 | 445 | 535 | 254 | 326 |
| **6** | 340 | 500 | 620 | 302 | 386 |
| **6.5** | 400 | 545 | 690 | 352 | 449 |
| **7** | 435 | 590 | 750 | 404 | 515 |
| **7.5** | 470 | 660 | 815 | 471 | 590 |
| **8** | 515 | 725 | 890 | 556 | 680 |
| **9** | 595 | 820 | 970 | 784 | 894 |
| **10** | 650 | 940 | 1040 | 957 | 1140 |
| **11** | 710 | 1050 | 1120 | 1100 | 1250 |
| **12** | 765 | 1185 | 1200 | 1260 | 1400 |
| **13** | - | - | 1320 | 1420 | 1560 |
| **14** | - | - | 1370 | 1610 | 1730 |
| **15** | - | - | 1400 | 1760 | 1940 |
| **16** | - | - | 1450 | 1870 | 2140 |
| **17** | - | - | - | 1960 | 2280 |
| **18** | - | - | - | 2040 | 2410 |
| **19** | - | - | - | 2130 | 2530 |
| **20** | - | - | - | 2200 | 2630 |
| **21** | - | - | - | - | 2710 |
| **22** | - | - | - | - | 2780 |

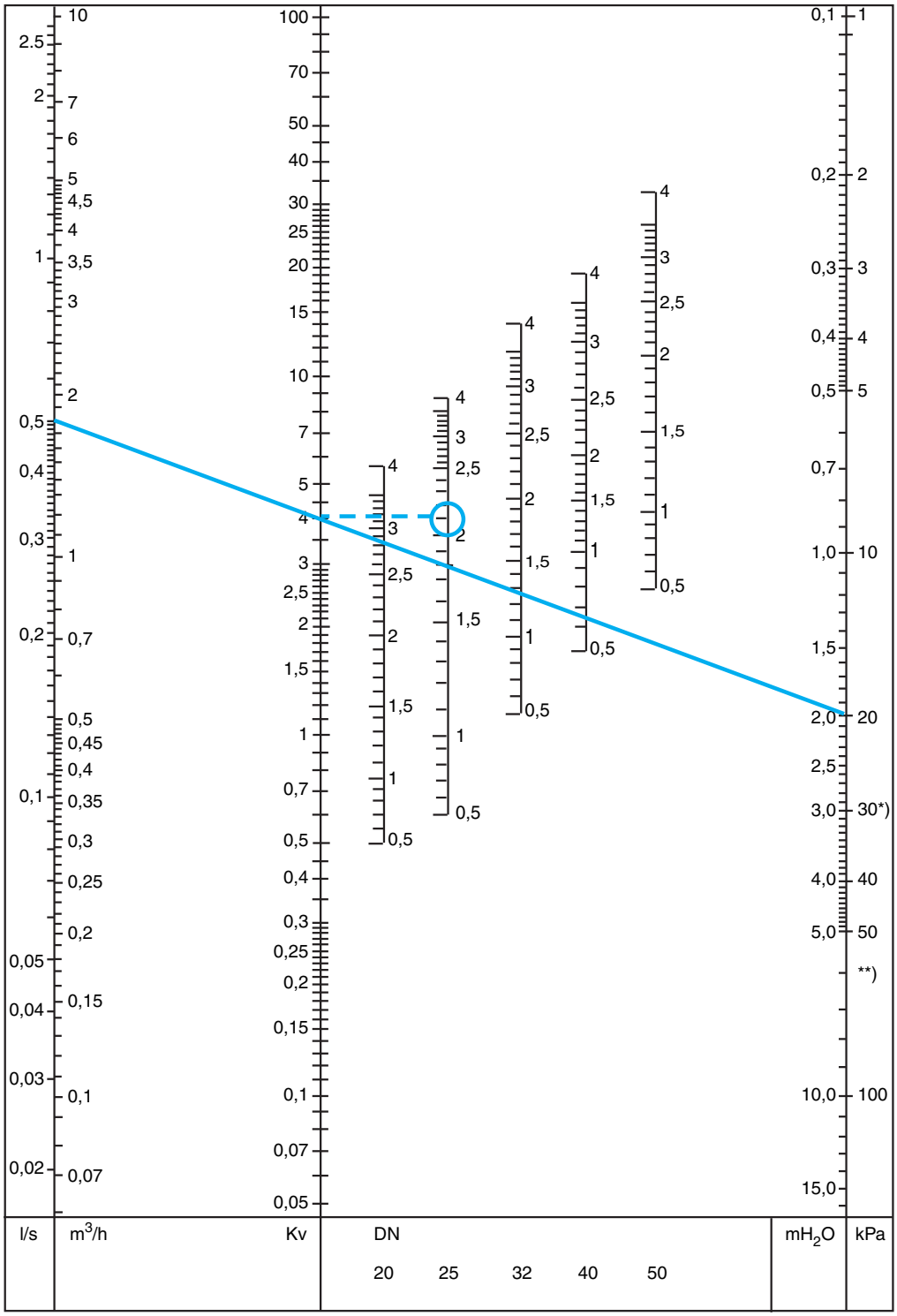
## DIAGRAM EXAMPLE

**Wanted:**
Presetting for DN 25 at a desired flow rate of 1.8 $m^3/h$ and a pressure drop of 20 kPa.

**Solution:**
Draw a straight line joining 1.8 $m^3/h$ and 20 kPa. This gives Kv=4.
Now draw a horizontal line from Kv=4.
This intersects the bar for DN 25 at the desired presetting of 2.1 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 20 kPa, Kv = 4 and flowrate 1.8 $m^3/h$. At 20 kPa and Kv = 0.4 we get the flow-rate 0.18 $m^3/h$, and at Kv = 40, we get 18 $m^3/h$. That is, for a given pressure drop, it is possible to read 10 times or 0.1 times the flow and Kv-values.

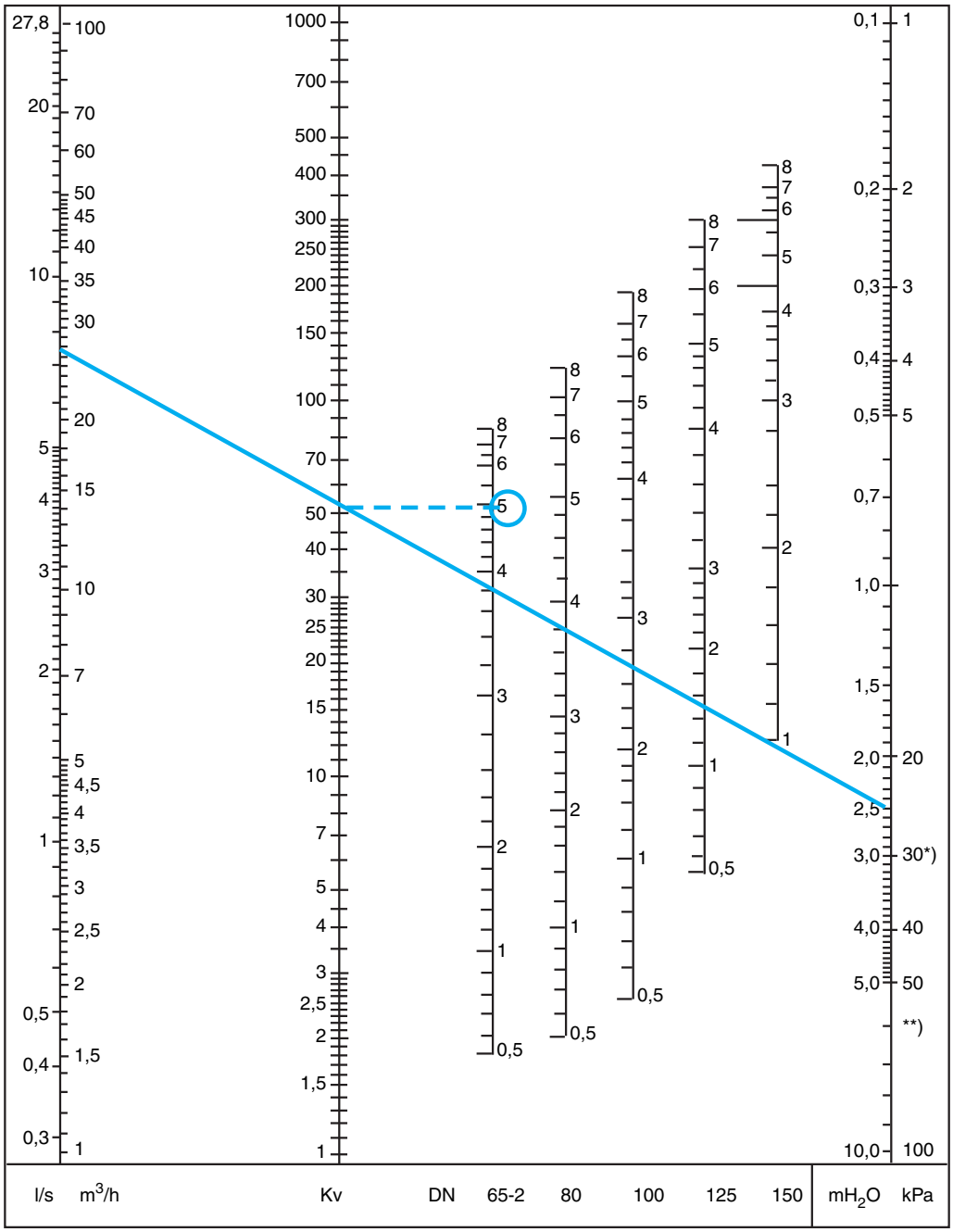
## DIAGRAM DN 20-50




*) 25 db (A)
**) 35 db (A)

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

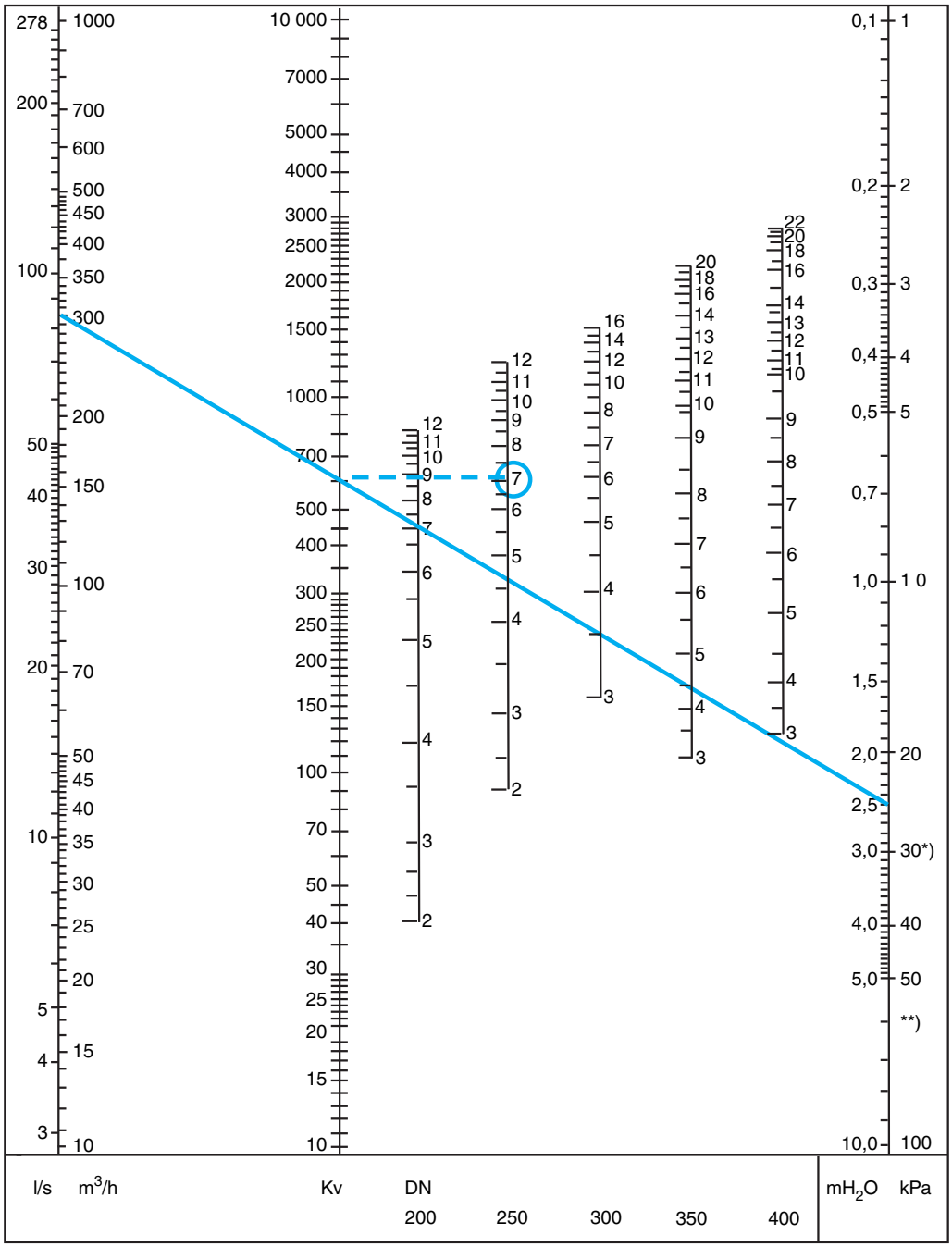
## DIAGRAM DN 65-150




*) 25 db (A)
**) 35 db (A)

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

## DIAGRAM DN 200-400




*) 25 db (A)
**) 35 db (A)

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




*5-5-15 STAF, STAF-SG 2009.11*