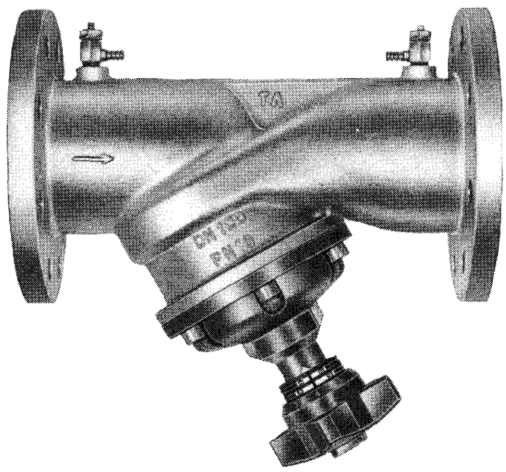
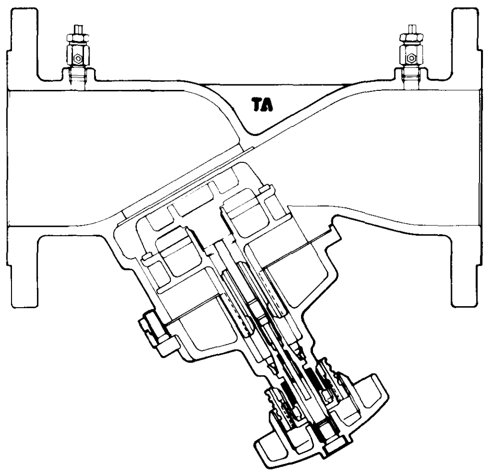
STA-F is a flanged balancing valve available in sizes DN 20—300, and has been designed with an oblique seat in order to give low resistance and large flows when the valve is fully open. Four turns of the handwheel are needed from closed to fully open positions for DN 20—50 valves.
Eight turns for DN 65—150 valves.
Twelve turns for DN 200—250 valves.
Sixteen turns for DN 300 valves.
This together with carfully designed valve cone gives a large and exact preset balancing range.

- **Isolating feature**
  PTFE seat ring for positive shut-off.
- **Balancing feature**
  Balancing and regulation of water flow.
- **Pressure test point**
  Pressure test points for measuring the water volume. By measuring the pressure drop over the valve the flow through the valve can be determined from the graphs. With DTM-C Electronic Differential Pressure Gauge the flow can be read off directly, see page 8 and section 9 of catalogue.
- The pre-setting value is readable on the nonius scale. Number of turns is read on the indicator collar and parts of turn are read on the handwheel.
- Concealed pre-setting.
- The large valves can be tightened by using a wrench on the handwheel flats. Width across flats 65—150 = 28 mm and 200—300 = 50 mm.

Accessories
Prefabricated insulation.
Differential pressure gauge.
Computer programme for balancing.
Form for balancing.
Fluorine rubber O-ring.





Description	Type	TA No
STA-F	Flange PN 16	52 180
Prefab insulation		52 189
Measuring nipples		52 179

TECHNICAL DESCRIPTION

Applications: Cooling and heating hydraulic systems.

Face to face dimensions:
ISO 5752 series 1.

Nominal pressure: PN 16.

Max working pressure: 1,6 MPa = 16 bar = 232 psi.

Max working temperature: Valve +150°C, seals in the P/T points stands 120°C. (On special request +150°C).

Surface treatment: For corrosive environments specially surface treatment with 0,1—0,2 mm nickel can be obtained on specific order.

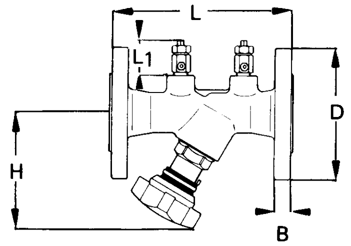
Material: Valve body: cast iron BS 1452: Grade 260. Bonnet, valve cone and stem: AMETAL®. Bonnet bolts: stainless steel. Valves provided with nylon handwheel for DN 20—50 and aluminium handwheel for DN 65—300 (red).
DN 200—300 has bonnet and cone holder in cast iron as above. The cone is in bronze LG2. Stem AMETAL®.

Flanges: PN 16. Conform to ISO 2084 and fit BS 4504:1969 table 16.

Fittings: The pressure test points besides the metal seal also have stem seal of the O-ring type of EPDM-rubber. Changeable in service if the pressure test points are closed. O-rings of fluorine rubber can be ordered for plants with continuous working temperatures above 120°C.

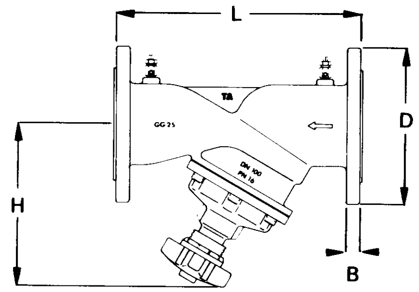
Testing: Each valve is individually tested before despatch, both for seat sealing and overall leak-tightness.

52 180 STA-F DN 20–50



TA No	Size DN	Number of bolt holes	L	H	D	B	Kvs*	Weight kg
52 180–020	20	4	150	94	105	16	5,7	
–025	25	4	160	102	115	16	8,7	
–032	32	4	180	108	140	18	13,9	
–040	40	4	200	118	150	18	20	
–050	50	4	230	122	165	20	32	

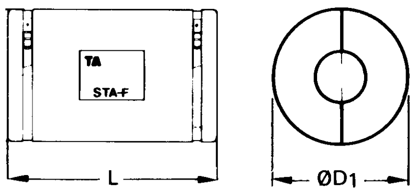
52 180 STA-F DN 65– 300



TA No	Size DN	Number of bolt holes	L	H	D	B	Kvs*	Weight kg
52 180–065	65	4	290	200	185	20	85	13.0
–080	80	8	310	215	200	22	120	17.5
–090	100	8	350	230	220	22	190	22.5
–091	125	8	400	265	250	24	300	33.5
–092	150	8	480	285	285	24	420	46.0
–093	200	12	600	450	340	30	765	110.0
–094	250	12	730	470	405	32	1185	148.0
–095	300	12	850	520	460	32	1700	210.0

Accessories:
2 pcs O-rings of fluorine rubber (Viton) in a plastic bag TA ref No 303 134–60
Measuring nipple 52 179–000 $L_1 = 30$ mm. Measuring nipple 52 179–601 $L_1 = 90$ mm

52 189 Prefab insulation



TA.No	For DN	L	D1
52 189–065	65	440	270
–080	80	465	290
–090	100	510	320
–091	125	585	380
–092	150	675	410

*)K_{vs} = m³/h at a pressure drop of 1 bar and fully open valve.

KV-VALUES

When calculating and dimensioning pipe systems, the following values or formulas for valve resistance must be used. In calculating work, they provide the actual capacity of the valve since the pressure drop is based on measurements (see SMS 1000) at the feed outlet at such a distance from the valve that turbulence inside the valve itself does not influence the values.

K_v values for various pre-settings

Turns \ DN	20	25	32	40	50	65	80	100	125	150	200	250	300
0,5	0,5	0,6	1,1	1,6	2,6	1,8	2	2,5	5,5	6,5	–	–	–
1	0,8	0,9	1,9	2,8	4,2	3,5	4	6	10,5	12	–	–	–
1,5	1,2	1,8	3,1	4,5	6,9	4,6	6	9	15,5	22	–	–	–
2	1,9	3,3	4,5	6,1	11,6	6,9	8	11,5	21,5	40	40	90	–
2,5	2,8	5,4	7,1	9,3	16,6	10,8	11	16	27	65	50	110	–
3	3,8	6,9	9,6	13,0	22,6	17	14	26	36	100	65	140	150
3,5	4,7	8,2	11,9	17,2	28	25,5	19,5	44	55	135	90	195	240
4	5,7	8,7	13,9	20	32	33	29	63	83	169	120	255	320
4,5	–	–	–	–	–	43	41	80	114	207	165	320	400
5	–	–	–	–	–	52	55	98	141	242	225	385	480
5,5	–	–	–	–	–	60,5	68	115	167	279	285	445	550
6	–	–	–	–	–	68	80	132	197	312	340	500	620
6,5	–	–	–	–	–	73	92	145	220	340	400	545	690
7	–	–	–	–	–	77	103	159	249	367	435	590	750
7,5	–	–	–	–	–	80,5	113	175	276	391	470	660	810
8	–	–	–	–	–	85	120	190	300	420	515	725	880
9	–	–	–	–	–	–	–	–	–	–	595	820	1000
10	–	–	–	–	–	–	–	–	–	–	650	940	1120
11	–	–	–	–	–	–	–	–	–	–	710	1050	1230
12	–	–	–	–	–	–	–	–	–	–	765	1185	1340
13	–	–	–	–	–	–	–	–	–	–	–	–	1440
14	–	–	–	–	–	–	–	–	–	–	–	–	1540
15	–	–	–	–	–	–	–	–	–	–	–	–	1620
16	–	–	–	–	–	–	–	–	–	–	–	–	1700

FORMULAS (For computer use only)

Turns $= 0{,}001\,(A + B\,K_V + C\,K_V^2 + D\,K_V^3 + E\,K_V^4 + F\,K_V^5)$

Coeff. \ DN	20	25	32	40	50
A	−24,3	−39,5	−15,5	−12,8	−29,95
B	1115,6	1352,8	497,6	325,2	263,1
C	366,0	−396,3	33,7	20,9	−6,69
D	−320,7	74,1	−16,1	−5,09	−0,186
E	73,58	−7,44	1,52	0,294	0,0147
F	−5,4015	0,3224	−0,0447	−0,0054	−0,000203

$K_V\ max \cong \frac{1}{590} \bullet (d+10)^{2,4}$ d = valve size in mm (20, 25 etc.)

Turns $= 0{,}001\,(A + B\,K_V + C\,K_V^2 + D\,K_V^3 + E\,K_V^4 + F\,K_V^5)$

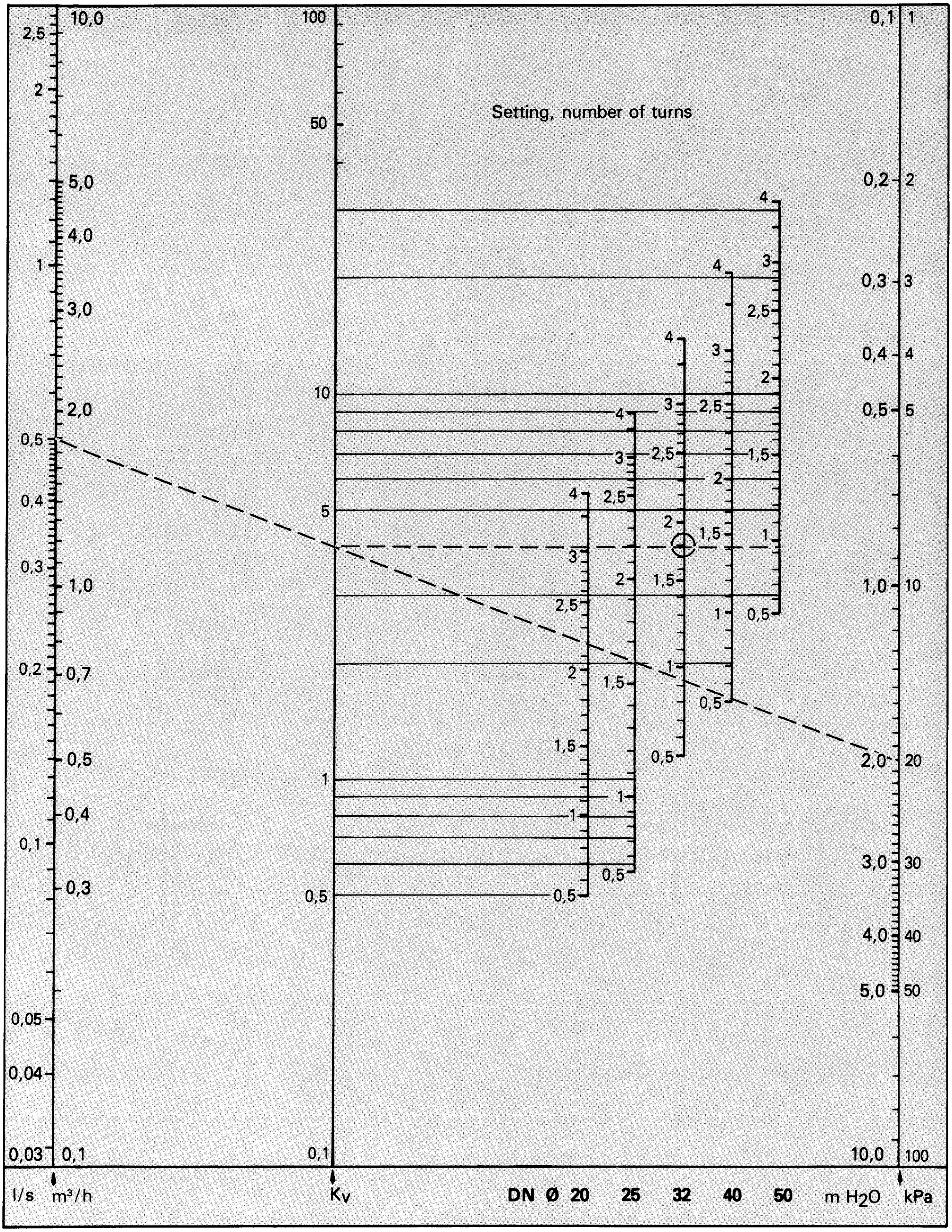
Coeff. \ DN	65	80	100	125	150
A	1,67	−67,9	41,47	−90,15	456,96
B	358,2	322,8	200,2	128,5	34,62
C	−15,14	−9,82	−4,30	−1,628	−0,101
D	0,343	0,156	0,0463	0,0107	0,000148
E	−0,00364	−0,00115	−0,000224	−0,0000322	0
F	0,0000150	0,00000326	0,00000040	0,00000003634	0

$K_V\ max \cong \frac{d^2}{53}$ d = valve size in mm (65, 80 etc.)

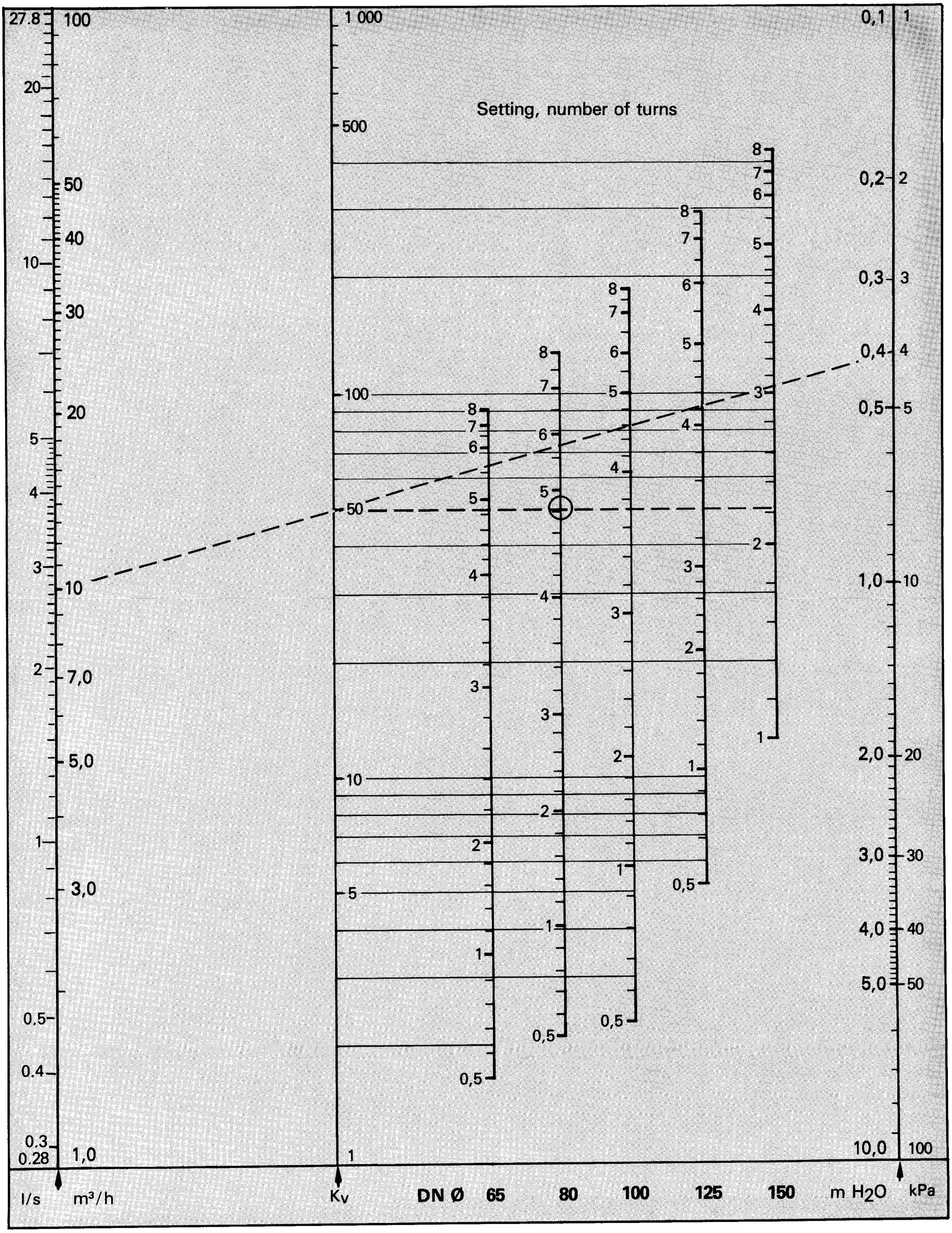
Turns $= 0{,}001\,(A + B\,K_V + C\,K_V^2 + D\,K_V^3)$

Coeff. \ DN	200	250	300
A	873,7	605,8	2051,4
B	29,4	15,34	5,9
C	−0,056	−0,011	0,000533
D	0,0000481	0,00000508	0,00000047

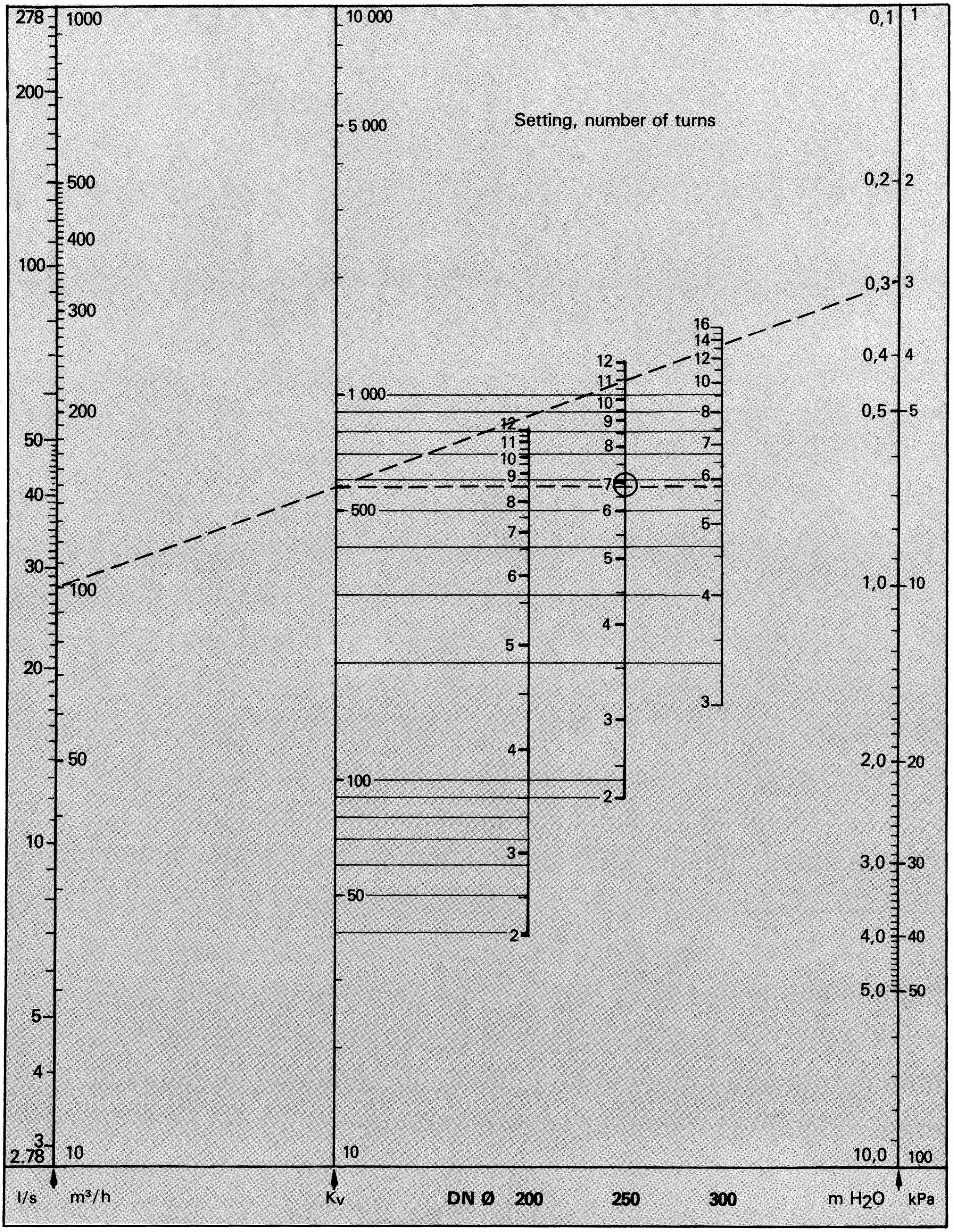
This graph shows the pressure drop over the pressure test points of the valve.



This graph shows the pressure drop over the pressure test points of the valve.



This graph shows the pressure drop over the pressure test points of the valve.



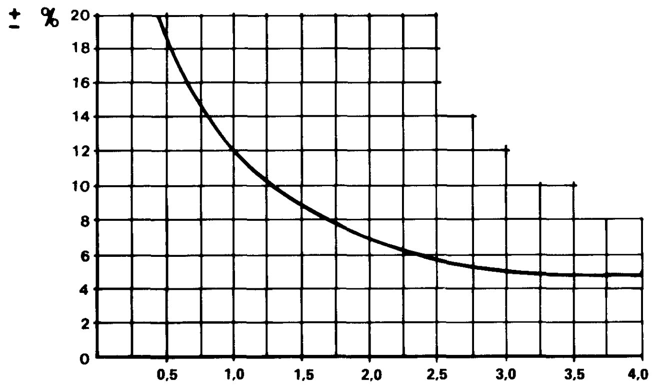
MEASURING ACCURACY

A valve that operates with a high level of flow capacity naturally has a large cross-section area when fully open. TA works with high tolerance demands with respect to valve seat and cone diameters. The level of accuracy is highest when the valve is open. The smaller the opening at which the valve is set, the greater the part played by manufacturing tolerances since the variation in measurement is then considerably more from the viewpoint of percentage .

As a result of extensive measurements carried out in our laboratory, it has been possible to determine the following anticipated maximum deviation in any installation:

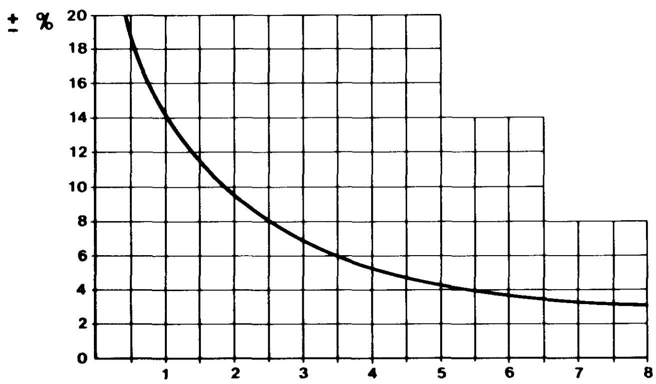
DEVIATION CONCERNING FLOW WITH DIFFERENT PRE-SETTINGS

STA-F DN 20—50



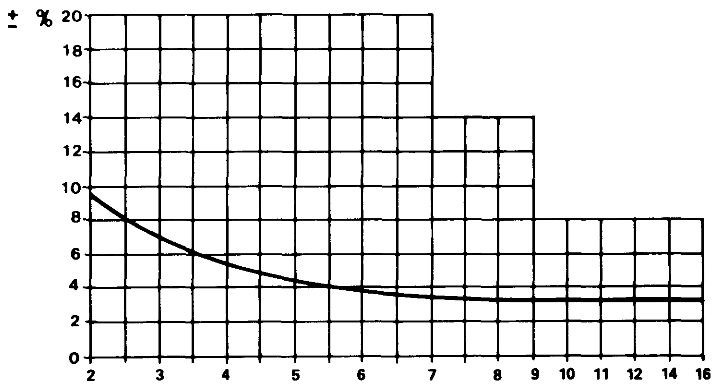
Pre-setting No. of turns

STA-F DN 65—150



Pre-setting No. of turns

STA-F DN 200—300



Pre-setting No. of turns

CORRECTION FACTORS FOR DIFFERENT LIQUIDS

For liquids other than water at 20°C, the pressure drop concerned can be obtained from the TA diagram after correction of ΔP with a factor equal the weight per unit volume in tons /m³.

Example

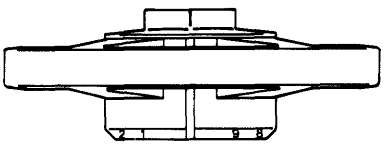
Known flow: Increase the pressure drop read off in the diagram by 10% if the weight per unit volume is 1.1 tons/m³.

Known pressure drop: Decrease pressure drop by 10% if weight per unit volume is 1.1 tons/m³, read off the flow in the diagram with this pressure drop.

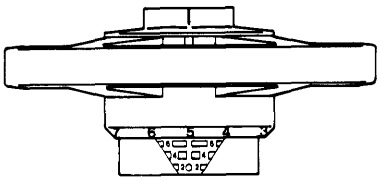
The above-mentioned applies to liquids that have on the whole the same viscosity ($\leq$20 cSt = 3°E = 100 S.U.) as water, that is to say most water/glycol mixtures and water/brine solutions.

PRE-SETTING

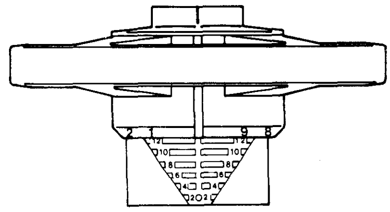
DN 200—250 (EXAMPLE)



Valve closed



The valve is pre-set 6.5



Valve open (12 turns)

Initial setting of a valve for a particular pressure drop, eg corresponding to 6.5 turns on the graph, is carried out as follows.

1. Close the valve fully (Fig. 1)
2. Open the valve in this case to the pre-set value 6.5 turns (Fig. 2)
3. Remove the handwheel screw without changing the setting, by means of an Allen key (5 mm).
4. Turn the inner stem clockwise until the stop is reached with Allen key 3 mm (long end). For DN 200—300 use a screw driver. Refit the handwheel screw.
5. The valve is now preset.

To check the pre-setting of a valve, open it to the stop position; the indicator then shows the pre-setting number, in this case 6.5 (Fig. 2).

As a guide in determining the correct valve size and setting (pressure drop) there are graphs for each size of valve showing the pressure drop at different settings and water volumes.

REGULATION OF WATER FLOWS

The actual pressure drops in water distribution pipework are difficult to establish by calculation. Meaning that the water flow and thereby also the caloric distribution, is often incorrect in practice, but with the STA-F valve it is easy to regulate the desired water flow. By measuring the pressure drop across the valve at a particular presetting value, the water flow for the size of valve concerned can be read off from the appropriate pressure drop graph.

PREPARATIONS FOR MEASURING

Valve

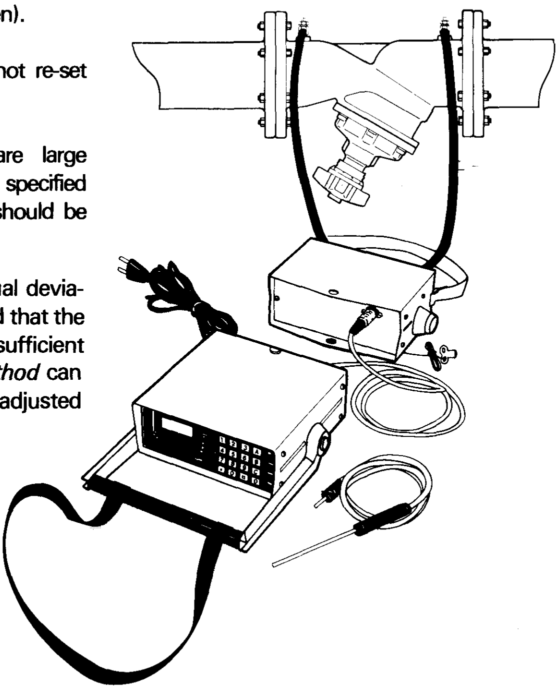
Open the valve to the desired pre-setting value, eg 6.5 by turning the handwheel until its indicator comes opposite 6.5 on the nonius scale.

Gauge

Use DTM-C electronic differential pressure gauge. DTM-C is pre-programmed with duty curves for TA valves STA-D (4 turns), STA-F and STA-T (1 turn) and with a conversion formula for K_V so that the measured differential pressure can be read off directly as flow. More information about DTM-C, see section 9.

BALANCING — WORKING PRESSURE

1. Pre-set all valves at the set values that have been calculated and are shown on the drawing.
2. Make sure that two-way balancing valves and radiator/thermostatic valves are open. (Lower the feed temperature so that self-actuating valves open).
3. Measure all the flows but do not re-set any flow at this stage.
4. If the individual deviations are large (more than ± 10% of the specified flow), adjustment of the flow should be carried out.
5. In the case of medium individual deviations or when it can be expected that the flow in the main pump is quite sufficient then the DTM-C *computer method* can be used and the valves can be adjusted in the desired order.



6. If there are great deviations, then the flow in the set valves changes to a great extent while the work is being carried out. The final result shows excessively high deviations for the individual valves. You can expect to check the system at lrast once. In such cases it is best to use the TA method.
7. When you use the TA method, you select the valve that is furthest away in the circuit to the reference valve. Using the main valve for this entire circuit, you maintain a fixed differential pressure of 290 mm at the correct flow through the reference valve. Then you take the remaining valves in this circuit one at a time starting fursthest away from the pump and adjusting to the correct flow.
8. Then you take the main pipe in the same way. When the system has been finally adjusted, all the provide the correct flow. If you found it vecessary to carry out restriction at the valve before the pump, then the pump should be adjusted or replaced by another pump with the right capacity.

Björsell, Borås