Data sheet

STV Series
Balancing Valves

STV / STVL   STVA / STVC

Applications/ Features:

Danfoss STV series of balancing valves provide testing and balancing of circuit flow for hydronic heating or cooling systems.

STV valves provide a high level of balancing accuracy using an easy to set multi-turn setting wheel and memory lock.

Features:

- Positive shut-off
- Built-in memory stop
- Multi-turn 360 hand wheel with vernier scale and digit readout
- Offset pressure/ temperature ports
- Presetting and locking with Allen key

Ordering Information:

Valve	Size	Weight lbs. (kg)	Cv∗	Connection	
				NPT (STV)	F. Solder (STVL)
STV / STVL	1/2″	1.2 (0.5)	4.1	065F8965	065F896501
	3/4″	1.3 (0.6)	5.9	065F8966	065F896601
	1″	1.7 (0.8)	10.2	065F8967	065F896701
	1-1/4″	2.7 (1.2)	15.2	065F8968	065F896801
	1-1/2″	3.3 (1.5)	22.6	065F8969	065F896901
	2″	5.1 (2.3)	36.5	065F8970	065F897001

Valve	Size	Weight lbs. (kg)	Cv∗	Connection	Code No.
STVA	2-1/2″	31 (14)	110	ANSI class 125 Flanged	065F8971
	3″	45 (20)	128		065F8972
	4″	58 (26)	222		065F8973
	5″	90 (41)	350		065F8974
	6″	112 (51)	495		065F8975
STVC	8″	275 (125)	696		065F8993
	10″	490 (222)	1405		065F8994
	12″	573 (260)	1764		065F8995

∗Cv= Flow rate in GPM with a pressure drop of 1 psi.

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Accessories:

Part	Description	Code No.
Test Plug	Red Tag	**065F8985**
	Blue Tag	**065F8986**
Gauge Adapter Measuring Needle	1/2" to 2" valves (1/16" diameter, 1.75" length)	**003Z40324**
	2-1/2" to 12" valves (1/8" diameter, 1.75" length)	**003Z0326**
Replacement hand wheel	Hand wheel, 1/2" to 2"	**900693**
	Hand wheel, 2-1/2" to 6"	**900694**

Technical Specifications:

Max. static pressure:	1/2" to 2": 290 psi (20 bar) 2-1/2" to 12": 232 psi (16 bar)
Temperature range :	1/2" to 2": -4° to 250°F (-20° to 120°C) 2-1/2" to 12": 14° to 250°F (-10° to 120°C)
Connection:	Female NPT and Female Solder (STV / STVL) ANSI 125 Flanged (STVA / STVC)
Pressure tappings:	P/T plugs
Allowable fluid	Closed loop application, 100% water, max 50% glycol mixture

System Layout:
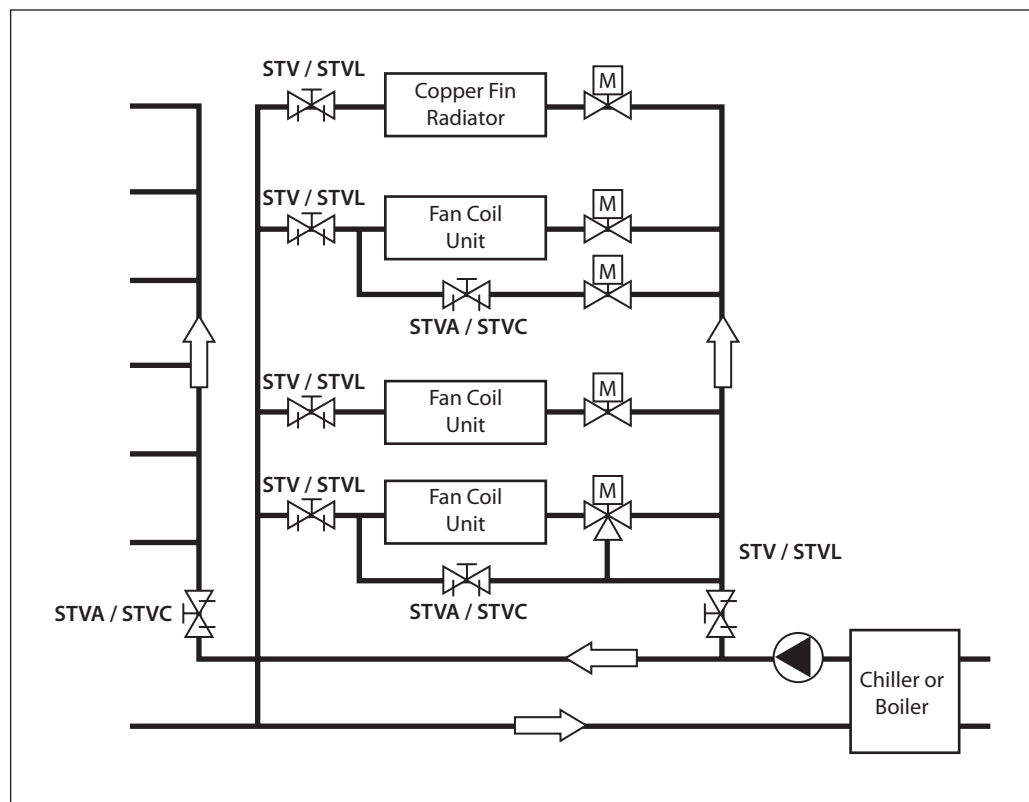
Installation:
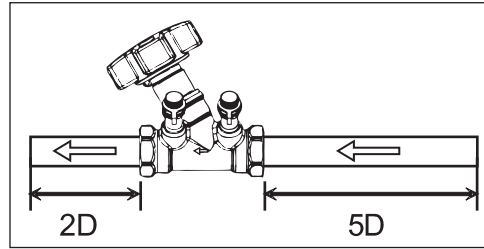
Install the balancing valve with the arrow on the valve's body pointing in the direction of the flow in the system.

To ensure an accurate reading, a straight length of 5 times the diameter of the pipe should be piped prior to the valve and a straight length of at least 2 times the pipe diameter should be piped after the valve.

If a pump is installed near the valve, a straight length of 10 times the diameter of the pipe should be piped prior to the valve to reduce an inaccurate measurement due to turbulence.

**Setting Flow Coefficient values
(Cv value = gpm@1psi ΔP):**

STV / STVL	Number of Turns										
Size	1	2	3	4	5	6	7	8	9	10	
1/2"	0.21	0.37	0.52	0.72	1.00	1.36	1.88	2.96	3.65	4.12	Cv Values
3/4"	0.39	0.70	0.96	1.31	1.80	2.44	3.36	4.47	5.22	5.92	
1"	0.56	0.89	1.19	1.74	2.67	4.18	5.80	7.54	9.16	10.20	
1-1/4"	0.92	1.53	2.09	3.13	4.76	6.84	9.05	11.30	13.30	15.20	
1-1/2"	1.39	2.38	3.25	4.76	7.19	10.3	13.90	17.10	19.80	22.60	
2"	2.32	4.18	6.03	8.82	13.80	19.4	24.60	29.00	33.20	36.50	

STVA	Number of Turns										
Size	1	2	3	4	5	6	7	8	9	10	
2-1/2"	3.2	5.9	11.1	23.2	41.2	59.2	76.6	91.1	101.0	108.0	Cv Values
3"	6.4	11.0	15.7	21.5	34.2	56.8	79.5	98.6	114.0	128.0	
4"	9.3	15.7	22.0	38.3	77.7	115.0	145.0	174.0	197.0	220.0	
5"	11.6	25.5	38.3	73.1	123.0	174.0	225.0	274.0	317.0	349.0	
6"	20.9	38.3	78.9	151.0	216.0	285.0	341.0	394.0	447.0	493.0	

STVC	Number of Turns														
Size	2	3	4	5	6	7	8	9	10	11	12	14	16	18	
8"	46	66	84	139	215	290	365	452	545	638	696	-	-	-	Cv Values
10"	116	160	204	349	494	689	884	1031	1177	1291	1405	-	-	-	
12"	116	180	244	396	546	708	869	1012	1153	1290	1427	1588	1668	1764	

Based upon the flow or differential pressures required within the system, the flow can be determined by using the equation:

$$Q = Cv \cdot \sqrt{\Delta p}$$

Q = flow
Cv = flow coefficient
Δp = differential pressure

For correction of fluids other than water, the following equation applies provided the viscosity of the fluid is the same for water, which is the case for most glycol and brine solutions:

$$Q_R = \frac{Q_M}{\sqrt{\delta}}$$

Q_R = real flow
Q_M = measured flow
δ = specific density of fluid
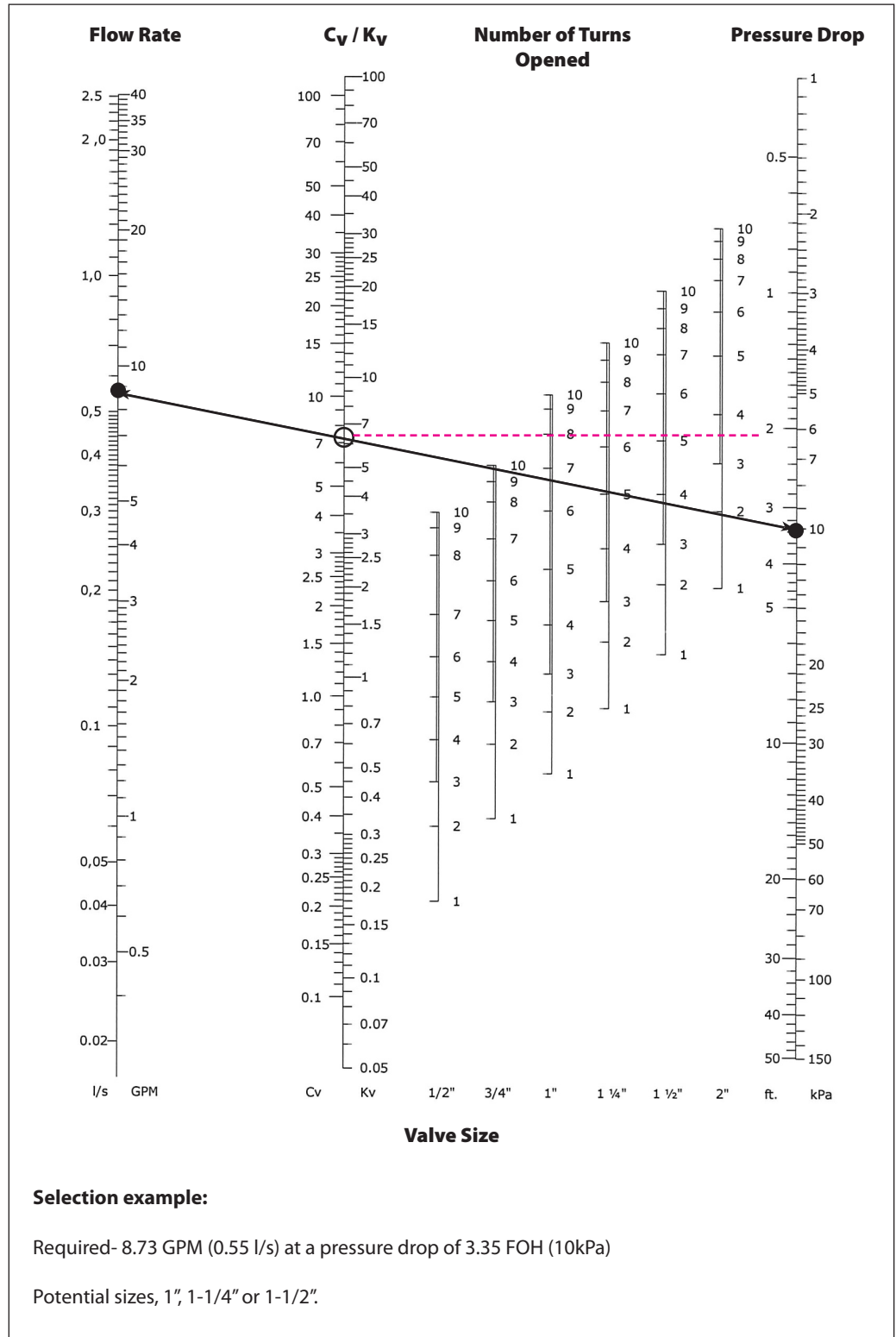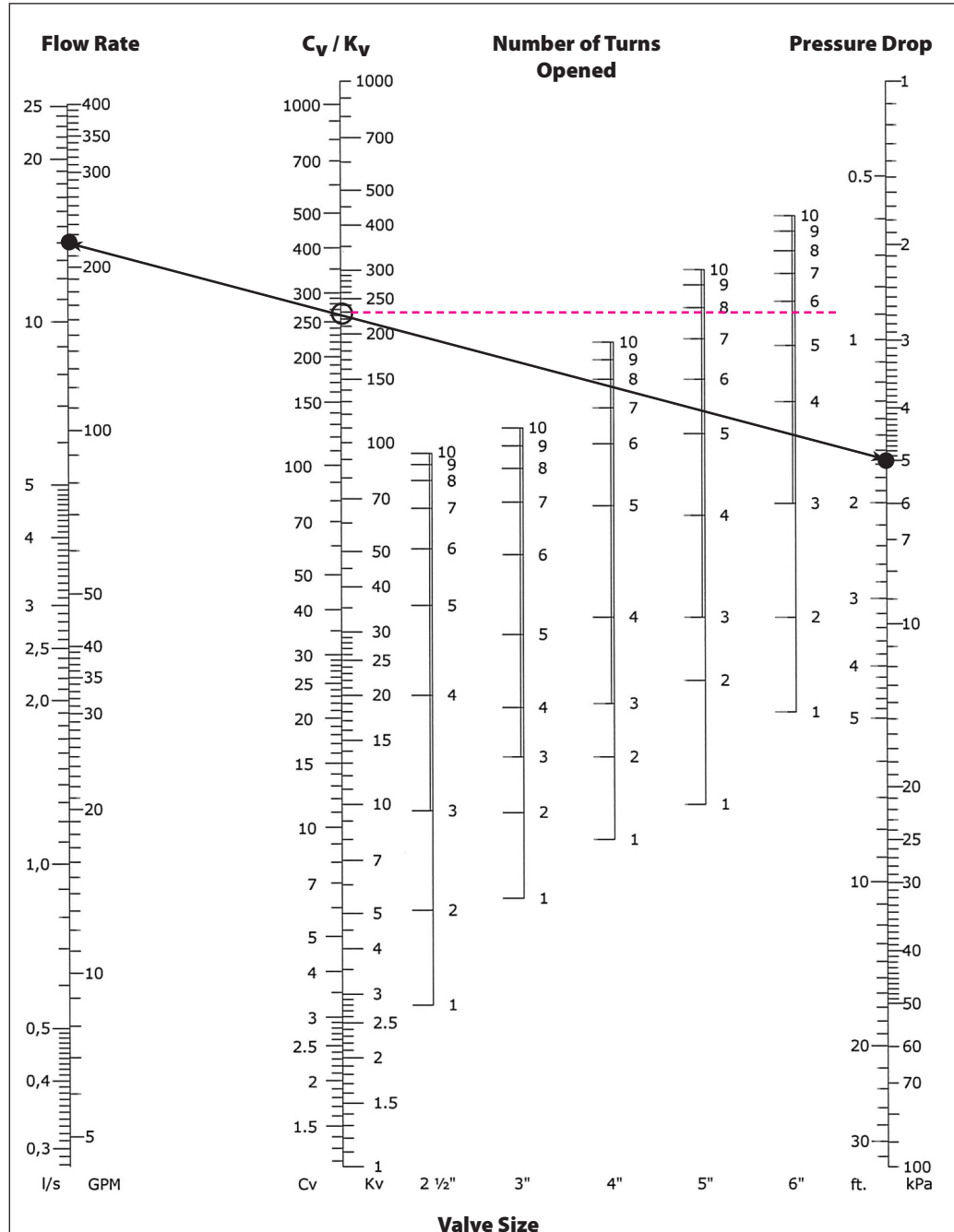
Flow Rate Graphs:

STV/STVL Balancing Valves 1/2" - 2"

1 foot of head (FOH) = 0.434 psi

1. Plot the required flow rate and pressure drop within the columns and then draw a line between these plotted points.

2. Draw an additional horizontal line from the intersection of the Cv column across the valve sizes.

3. Based upon the intersection of the horizontal line with the valves sizes, select the appropriate sized valve.

In selecting the valve, a margin of allowance for adjustment should be considered if during commissioning the pressure drop is lower than designed. This reduced pressure drop may result in an undersized valve.

The selection of a valve that has a pre-set value above 3 turns offers better accuracy when setting.

Selection example:

Required- 8.73 GPM (0.55 l/s) at a pressure drop of 3.35 FOH (10kPa)

Potential sizes, 1", 1-1/4" or 1-1/2".

Flow Rate Graphs:

STVA Balancing Valves 2-1/2" - 6"

1 foot of head (FOH) = 0.434 psi

1. Plot the required flow rate and pressure drop within the columns and then draw a line between these plotted points.

2. Draw an additional horizontal line from the intersection of the Cv column across the valve sizes.

3. Based upon the intersection of the horizontal line with the valves sizes, select the appropriate sized valve.

In selecting the valve, a margin of allowance for adjustment should be considered if during commissioning the pressure drop is lower than designed. This reduced pressure drop may result in an undersized valve.

The selection of a valve that has a pre-set value above 3 turns offers better accuracy when setting.

Selection example:

Required- A flow rate of 222 GPM (14 l/s) and a pressure drop of 1.67 FOH (5 kPa)

The required balancing valve for this application is a 5" with a setting of 7.8 turns or a 6" with a setting of 5.8 resulting in a Cv of 263 (Kv=225).
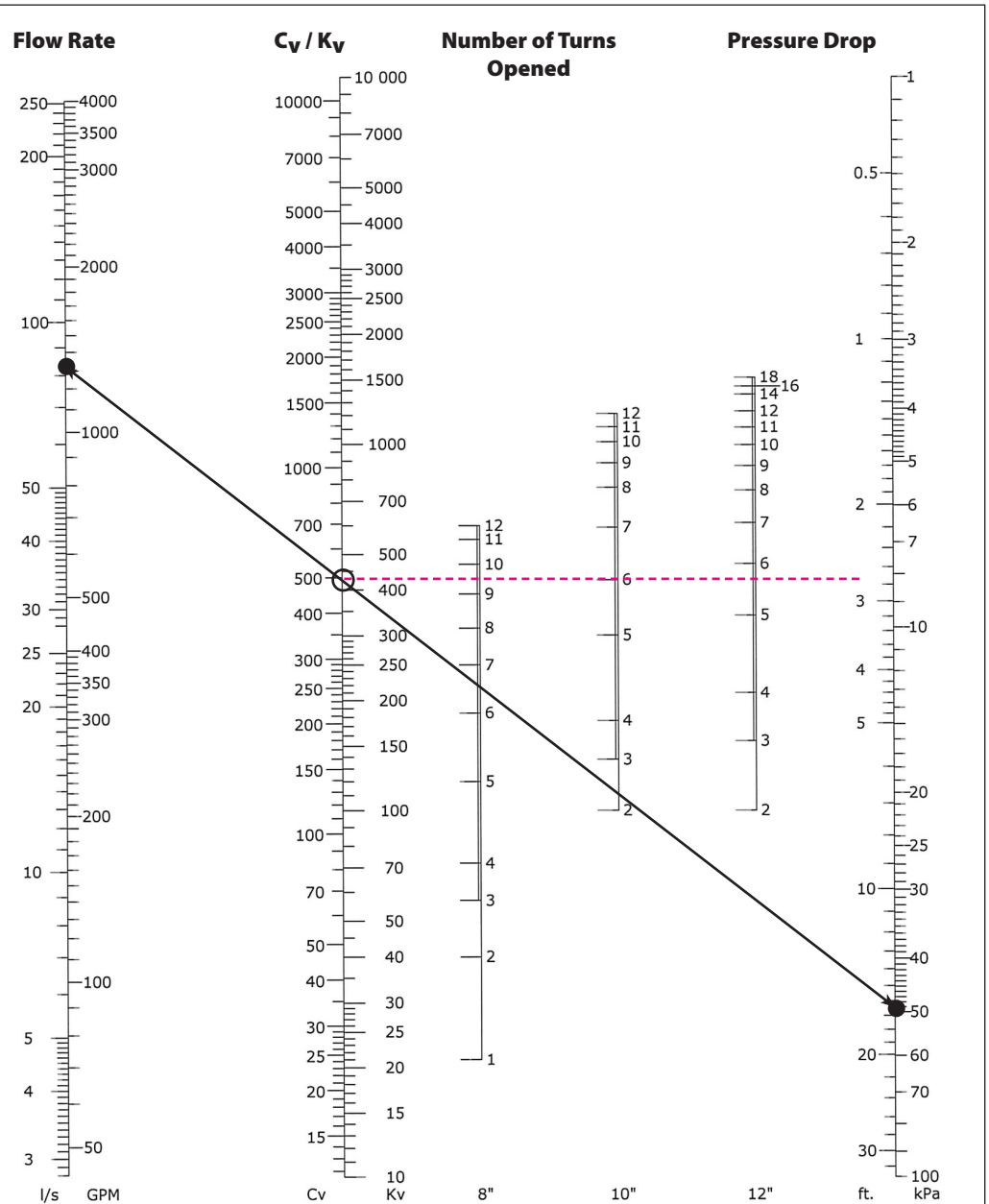
Flow Rate Graphs:

1 foot of head (FOH) = 0.434 psi

1. Plot the required flow rate and pressure drop within the columns and then draw a line between these plotted points.

2. Draw an additional horizontal line from the intersection of the Cv column across the valve sizes.

3. Based upon the intersection of the horizontal line with the valves sizes, select the appropriate sized valve.

In selecting the valve, a margin of allowance for adjustment should be considered if during commissioning the pressure drop is lower than designed. This reduced pressure drop may result in an undersized valve.
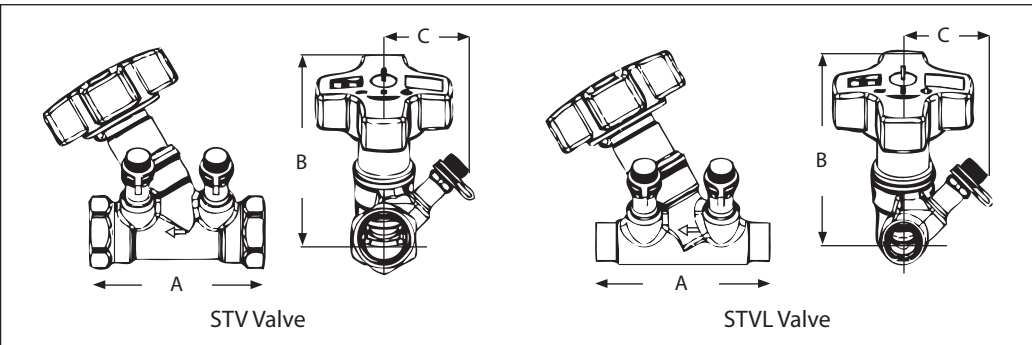
The selection of a valve that has a pre-set value above 3 turns offers better accuracy when setting.

STVA Balancing Valves 8" - 12"

Selection example:
Required- A flow rate of 1,316 GPM (83 l/s) and a pressure drop of 16.73 FOH (50 kPa)

The balancing valve for this application could be an 8" valve set for 9.5 turns, a 10" valve set for 6 turns or a 12" valve set for 5.8 turns resulting in a Cv of 502 (Kv=430).

**Dimensions and
Construction:**

STV Valve   STVL Valve

STV / STVL			
Size	**A** **in (mm)**	**B** **in (mm)**	**C** [2] **in (mm)**
1/2″	3.4 (86.4)	3.7 (93.9)	1.6 (40.6)
3/4″	3.5 (88.9)	3.7 (93.9)	1.7 (43.2)
1″	4.0 (104.1)	3.8 (96.5)	1.7 (43.2)
1-1/4″	4.7 (119.4)	3.8 (96.5)	1.9 (45.7)
1-1/2″	5.2 (132.1)	4.3 (109.2)	1.9 (45.7)
2″	6.1/6.5 (153.9/164.1)[1]	4.4 (111.7)	2.1 (53.1)

Body and parts in contact with liquid	Dezincification resistant brass
Gaskets:	EPDM
Seat Seal:	EPDM
Handwheel:	Polyamide Plastic

[1] STVL F.Solder version, [2] P/T Tap offset

STVA / STVC			
	Size	**L1** **in (mm)**	**H1** **in (mm)**
STVA	2-1/2″	11.4 (290.1)	8.9 (227.1)
	3″	12.2 (309.9)	9.5 (241.3)
	4″	13.8 (350.0)	10.2 (259.1)
	5″	15.8 (400.1)	11.7 (297.9)
	6″	18.9 (480.1)	12.1 (306.1)
STVC	8″	23.6 (599.4)	20.1 (510.5)
	10″	28.7 (729.9)	20.9 (530.9)
	12″	33.5 (850.9)	24.0 (609.6)

STVA / STVC	
Body and bonnet:	Cast iron
Seat seal:	PTFE
Gaskets:	EPDM
Other metal parts:	Brass
Hand wheel, **STV / STVL / STVA**	Ploymide Plastic

Data sheet

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Balancing Valves

Typical specification:

The balancing valve shall be of a brass construction and have female national pipe thread (NPT) or female solder connections. The valve shall be suitable for heating or cooling closed loop circuits. The balancing valve shall be capable of positive shut off and have P/T plug connections for testing. The valve adjustment shall be done via hand wheel hand wheel with digit readout within the handle of the valve. The balancing valve shall a hidden memory feature stop to prevent unauthorized adjustment and to ensure a return to the preset position. The memory stop within the valve shall be set via inner stem of the valve to prevent tampering. The valve shall be an STV series balancing valve.