

T 8082 EN

Pneumatic Control Valves with AC-1 Trim

Series 240 and 250



Application

Optimized trims for low-noise pressure letdown of liquids with differential pressures up to 40 bar

Valve size	DN 50 to 300	· NPS 2 to 12
Pressure rating	PN 16 to 160	· Class 150 to 900
Temperature range	-10 to +220 °C	· 14 to 428 °F

The optimized **AC-1** trim has the following special features:

- Raised seat
- Parabolic plug with integrated guide in the seat

Versions

Standard version for SAMSON valves according to Table 2

- **AC-1** · Optimized trim for valves in DN 50 to 300 or NPS 2 to 12

Further versions:

- **Balanced valve plug** with PTFE seal · Possible for DN 200/NPS 8 and larger and with a seat bore of minimum 150 mm (Type 3241)
- **Balanced valve plug** with graphite seal · On request

Principle of operation

The medium flows in the flow-to-open direction through the valve. The valve plug determines the cross-sectional area of flow. The K_V coefficient is adapted over the plug.

To avoid vibrations, the plug is double guided by a guide bushing at the top and a second guide in the seat.

AC-1 trim

Compared to standard valve trims, these trims considerably reduce the sound pressure level for differential pressure ratios between $X_F = 0.25$ and $X_F = 0.75$ by shifting the point of incipient cavitation.

Depending on the valve load, the sound pressure level is reduced to varying degrees.

The differential pressure ratio X_F is defined as follows:

$$X_F = \frac{\Delta p}{p_1 - p_v}$$

with Δp being the differential pressure across the valve, p_1 being the upstream pressure and p_v representing the vapor pressure of the medium.

The reduction of the sound pressure level ΔL_{pa} compared to a standard valve trim is exemplified in Fig. 3 and Fig. 4. The diagrams illustrate four different valve loads.

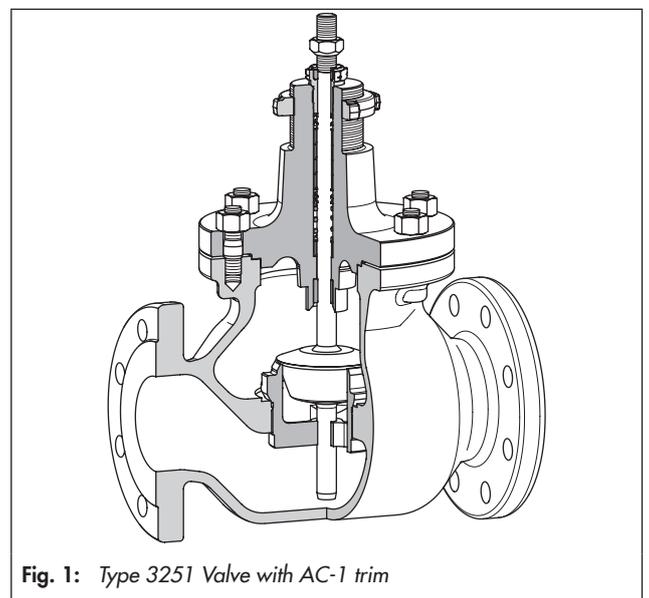


Fig. 1: Type 3251 Valve with AC-1 trim

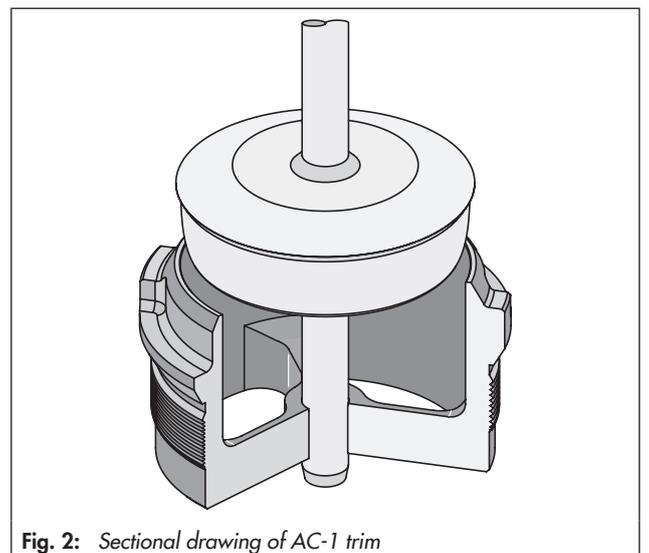


Fig. 2: Sectional drawing of AC-1 trim

Table 1: Technical data for AC-1 trim

Trim	AC-1 trim
Valve size	DN 50 to 300 · NPS 2 to 12
Pressure rating	PN 16 to 160 · Class 150 to 900
Temperature range	-10 to +220 °C · 14 to 428 °F
Δp_{\max} Max. permissible differential pressure	Operation without cavitation: < 40 bar · < 580 psi
	Operation with cavitation: < 25 bar · < 360 psi
Process medium	Liquids only
Flow direction	Flow-to-open (FTO) only
Closure member	Double-guided parabolic plug
Seat-plug seal Leakage class (according to IEC 60534)	Metal seal, class IV IV-S1 with SB \geq 100 · IV-S2 with SB < 100
K_v/C_v coefficient	Refer to Table 2
Characteristic	Equal percentage
Rangeability	50 : 1
Seat bore	Refer to Table 2
Travel	Refer to Table 2
Seat/plug material	1.4404 armored with Stellite®/1.4006 armored with Stellite®/1.4301

Reduction of the sound pressure level

The diagrams illustrate the reduction of the sound pressure level ΔL_{pa} when using the AC Trims as opposed to a standard trim. ΔL_{pa} values of other AC Trims available on request.

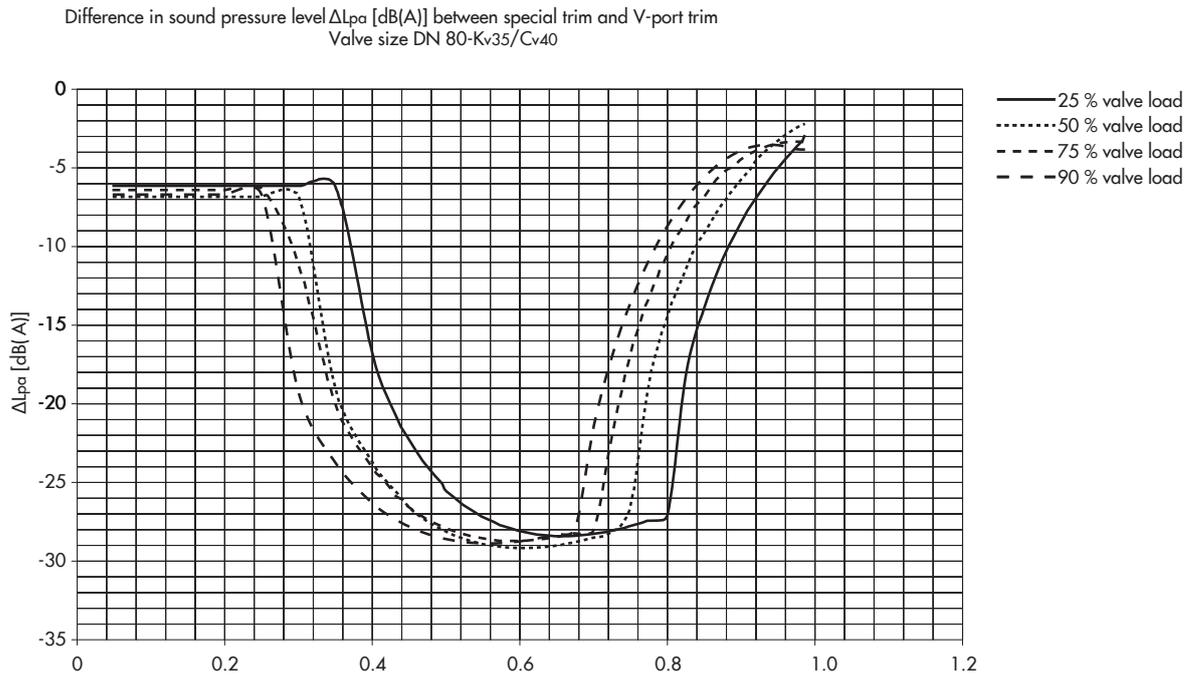


Fig. 3: Valve size DN 80 (NPS 3)

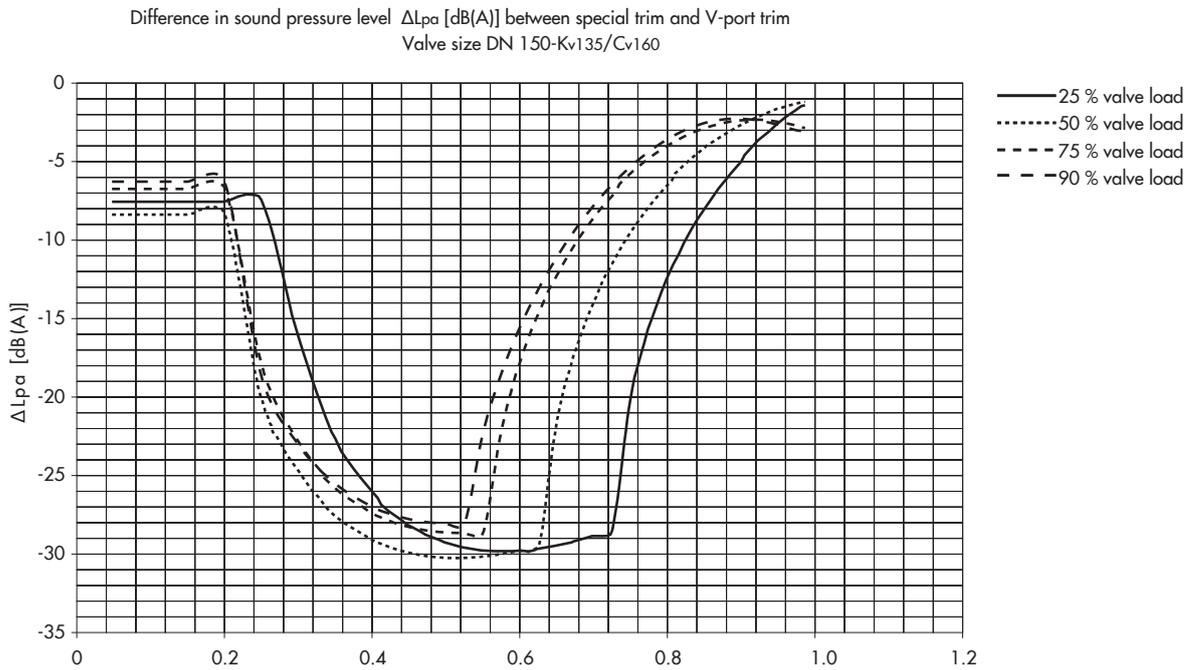


Fig. 4: Valve size DN 150 (NPS 6)

Table 2: AC-1 trim · Valve sizes with associated K_V and C_V coefficients

The specified travels must be achieved including an overtravel of 10 %. The use of a mechanical travel stop is required for fail-close actuators.

Valve size	SB [mm]	Travel [mm]	K_V	C_V	Type ... Valve	X_{Fz} value (valve load in %)
DN 50 NPS 2	38	15	22	26	3241	0.43 (90 %) 0.46 (75 %) 0.52 (50 %) 0.61 (25 %)
	48	15	35	40	3241	0.34 (90 %) 0.38 (75 %)
	50	30			3251/3256	0.45 (50 %) 0.54 (25 %)
DN 80 NPS 3	38	15	22	26	3241	0.43 (90 %) 0.46 (75 %) 0.52 (50 %) 0.61 (25 %)
	48	15	35	40	3241	0.34 (90 %) 0.38 (75 %)
	50	30			3251/3256	0.45 (50 %) 0.54 (25 %)
	63	15	50	60	3241	0.31 (90 %) 0.35 (75 %)
		30			3251/3256	0.44 (50 %) 0.56 (25 %)
	80	30	60	70	3251 3256	0.38 (90 %) 0.42 (75 %) 0.49 (50 %) 0.60 (25 %)
70			80	0.35 (90 %) 0.38 (75 %) 0.47 (50 %) 0.58 (25 %)		
DN 100 NPS 4	48	15	38	45	3241	0.33 (90 %) 0.36 (75 %)
	50	30			3251/3256	0.43 (50 %) 0.53 (25 %)
	63	30	55	65	3241	0.29 (90 %) 0.33 (75 %)
					3251/3256	0.42 (50 %) 0.54 (25 %)
	80	30	75	90	3241	0.33 (90 %) 0.37 (75 %)
					3251/3256	0.45 (50 %) 0.57 (25 %)
100	30	100	120	3241	0.37 (90 %) 0.40 (75 %)	
				3251/3256	0.48 (50 %) 0.59 (25 %)	
DN 150 NPS 6	80	30	95	110	3241	0.27 (90 %) 0.32 (75 %)
					3251/3256	0.41 (50 %) 0.53 (25 %)
	100	30	145	170	3241/3251/3256	0.28 (90 %) 0.32 (75 %) 0.41 (50 %) 0.54 (25 %)
					3241	0.25 (90 %) 0.29 (75 %)
	125	30	205	240	3251/3256	0.38 (50 %) 0.50 (25 %)
60						

Valve size	SB [mm]	Travel [mm]	K _v	C _v	Type ... Valve	X _{Fz} value (valve load in %)
DN 150 NPS 6	150	60	205	240	3251 3256	0.34 (90 %) 0.37 (75 %) 0.45 (50 %) 0.57 (25 %)
			250	290		0.28 (90 %) 0.33 (75 %) 0.41 (50 %) 0.54 (25 %)
DN 200 NPS 8	100	30	155	180	3241 3251 3256	0.27 (90 %) 0.31 (75 %) 0.40 (50 %) 0.53 (25 %)
	125	60	230	270		0.22 (90 %) 0.26 (75 %) 0.36 (50 %) 0.49 (25 %)
	150	60	305	360		0.24 (90 %) 0.28 (75 %) 0.37 (50 %) 0.51 (25 %)
	200	60	360	420		0.33 (90 %) 0.37 (75 %) 0.45 (50 %) 0.57 (25 %)
480			560	0.26 (90 %) 0.31 (75 %) 0.40 (50 %) 0.52 (25 %)		
DN 250 NPS 10	100	30	155	180	3241 3251 (3254)	0.27 (90 %) 0.31 (75 %) 0.40 (50 %) 0.53 (25 %)
	125	60	230	270		0.22 (90 %) 0.26 (75 %) 0.36 (50 %) 0.49 (25 %)
	150	60	305	360		0.24 (90 %) 0.28 (75 %) 0.37 (50 %) 0.51 (25 %)
	200	60	360	420		0.33 (90 %) 0.37 (75 %) 0.45 (50 %) 0.57 (25 %)
480			560	0.26 (90 %) 0.31 (75 %) 0.40 (50 %) 0.52 (25 %)		
DN 300 NPS 12	125	60	230	270	3241 3251 (3254)	0.22 (90 %) 0.26 (75 %) 0.36 (50 %) 0.49 (25 %)
	150	60	305	360		0.24 (90 %) 0.28 (75 %) 0.37 (50 %) 0.51 (25 %)
	200	60	480	560		0.26 (90 %) 0.31 (75 %) 0.40 (50 %) 0.52 (25 %)
	250	120	1000	1150		0.20 (90 %) 0.24 (75 %) 0.33 (50 %) 0.48 (25 %)

Order specifications:

AC-1 trim with K_V/C_V according to Table 2

Material

For tag number ...

In order/quotation ...

Operating pressure	in bar (a), bar (g) or psi (a), psi (g) (with minimum, normal and maximum flow rate)
Flow rate	kg/h or m ³ /h in operating state with minimum, normal and maximum flow rate
Process medium	Density in kg/m ³ Temperature in °C/°F Vapor pressure in bar
Valve size	DN ... or NPS ...
Pressure rating	PN ... or Class ...
Material	Refer to Table 1