

Pneumatic Control Valve Type 3345-1 and Type 3345-7 Diaphragm Valve Type 3345

Application

Control valve for viscous, corrosive, and abrasive fluids conforming to DIN, BS or ANSI standards

Nominal sizes	DN 15 to 150	·	NPS ½ to 6
Maximum pressure	10 bar	·	150 psi
Temperature range	-10 to 160 °C	·	14 to 320 °F



Type 3345 Diaphragm Valve with:

- Type 3271 Pneumatic Actuator (Type 3345-1 Control Valve) or
- Type 3277 Pneumatic Actuator (Type 3345-7 Control Valve) for integral positioner attachment

Valve body made of:

- Cast iron
- Spheroidal graphite iron or
- Cast stainless steel

The valve can be used for numerous different types of process media by various lining materials.

Versions

Standard version · Type 3345 Diaphragm Valve, DN 15 to DN 150 (NPS ½ to 6), maximum pressure 10 bar (150 psi), body made of cast iron, elastomer diaphragm (butyl 300) for temperatures ranging from -10 to 130 °C (14 to 266 °F); flanges according to DIN

- **Type 3345-1** (Figs. 1 and 2) · Diaphragm valve with Type 3271 Pneumatic Actuator (see Data Sheets T 8310-1 EN and T 8310-2 EN)
- **Type 3345-7** (Fig. 3) · Diaphragm valve with Type 3277 Pneumatic Actuator (see Data Sheet T 8310-1 EN)

Additional versions with:

- Valve body with or without lining made of cast iron, spheroidal graphite iron, cast steel, or cast stainless steel
- Valves with flanges conforming to ANSI or British Standard
- Version for food processing industry made of stainless cast steel with:
 - Welding ends for pipes acc. to DIN 11 850 Series 2 for DN 15 to DN 150 · DIN EN ISO 1127 · ISO 2037
 - BS 4825 · ASTM A270 (O.D.) · SMS 3008
 - Clamps acc. to DIN 32676 · ISO 2852 · BS 4825
 - Threaded connections acc. to DIN 11 887 · ISO 2853 (IDF) SMS 1146 · DIN 11864-1 Form A
 - Sterile flanges acc. to DIN 11864-2 Form A
- With Type 3274 Electrohydraulic Actuator
- Other diaphragm materials · On request
- Nominal sizes DN 8 and DN 10 · On request
- With piston actuator · On request



Fig. 1 · Type 3345-1 Diaphragm Valve, DN 100



Fig. 2 · Type 3345-1 Diaphragm Valve, DN 50, Version for food processing industry



Fig. 3 · Type 3345-7 Diaphragm Valve, DN 25, Version for food processing industry

- Valves in nominal pressure PN 16, nominal sizes DN 15 to DN 50 with elastomer diaphragms (see Fig. 4, S) · On request

Principle of operation

The valve diaphragm acts as a valve plug. The flow rate depends on the free cross-section between the diaphragm and the bottom part of the valve body.

The actuator stem is fitted with stoppers which limit the force to protect the diaphragm.

Fail-safe position

Depending on the arrangement of the compression springs in the actuator (see Data Sheet T 8310-1 EN or T 8310-2 EN for details), the valve has two fail-safe positions which become effective upon supply air failure:

Actuator stem extends (FA)

The valve is closed upon air supply failure.

Actuator stem retracts (FE)

The valve is opened upon air supply failure.

Pressure-temperature diagram for

- Elastomer diaphragms
DN 15 to DN 150 according to curve 1
Special version in PN 16:
DN 15 to DN 50 according to curve S
- PTFE diaphragms
DN 15 to DN 125 according to curve 1 and
DN 150 according to curve 2

The operating pressures are restricted by the temperature ranges listed in Table 3.

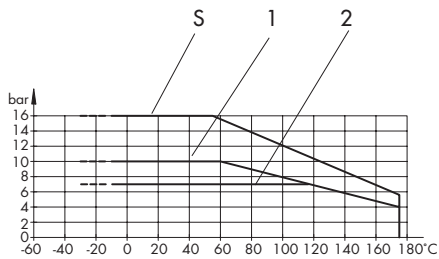


Fig. 4 · Pressure-temperature diagram

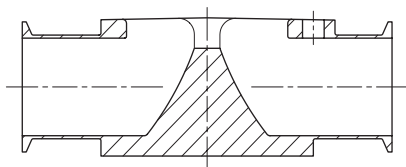


Fig. 5 · Type 3345 Valve, stainless steel with clamp connections

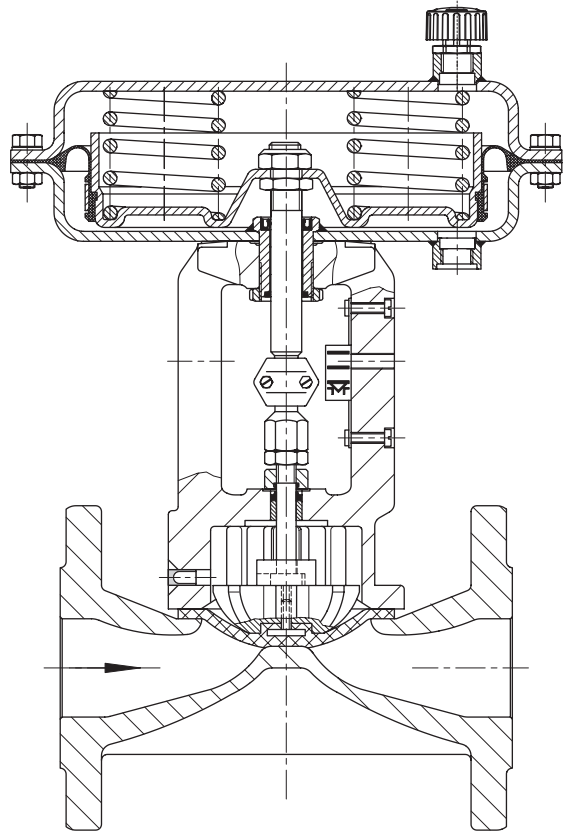


Fig. 6 · Standard version of Type 3345-1

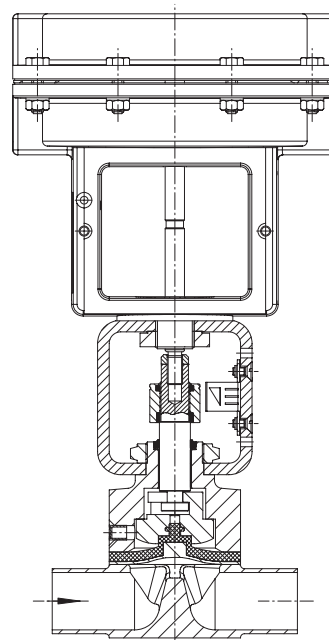


Fig. 7 · Type 3345-7, DN 25 with Type 3277 Actuator

Table 1 · Technical data

Version	DIN		ANSI / BS
Nominal size	DN 15 ... 150		NPS ½ ... 6
End connections	Flanges	PN 10/16	Flanges Class 125/150
	Face-to-face dimensions	EN 558-1 Series 1, Table 7	EN 558-1 Series 7, Table 7
Special version for food industry in DN 15 ... 150	Threaded connections	DIN 11887 · ISO 2853 (IDF) · SMS 1146 · DIN 11864-1 Form A	
	Clamp connections	DIN 32 676 · ISO 2852 · BS 4825 Part 3	
	Welding ends	For pipes acc. to: DIN 11 850 Series 2 · DIN EN ISO 1127 ISO 2037 (NFA 49-249) · BS 4825 · ASTM A270 (O.D.) · SMS 3008	
Maximum pressure	10 bar		150 psi
Temperature range for standard version (see also Table 3)	-10 ... 130 °C		14 to 266 °F
Characteristic	Linear		
Rangeability	30 : 1		
Leakage class	DIN EN 1349: Class VI		ANSI FCI 70-2

Table 2 · Materials for body and linings (DN 20 and larger)

Version	Material		Lining ¹⁾
	DIN	ANSI (BS)	
Body	Cast iron EN-JL1040	A 126 B (Grade 250)	Without
			Ebonite (NR)
			Butyl (IIR)
			Enamel
	Spheroidal graphite iron EN-JS1025	A 395 (Grade 420/12)	Without
			ETFE
1.4408	A 351 CF8M (Grade 316 C 16)	Without	
1.4435 · 1.4404 ³⁾	A 182 F 316L (Grade 316 L) ³⁾	Without	
Bonnet	EN-JL1040 ⁴⁾ · 1.4404/Alu ⁵⁾	A 126 B (Grade 250) ⁴⁾ · 316 L/alum. ⁵⁾	-
Compressor	EN-JL1040 · Stainless steel/ aluminum ⁵⁾	Aluminum ⁵⁾ A 126 B (Grade 250) · Stainless steel ⁵⁾	
Bushing	POM · PTFE/stainless steel only for food processing industry ⁵⁾		
Diaphragm	Elastomer diaphragms: Butyl (300), FPM/FKM (226), ethylene propylene (425) Diaphragms with PTFE layer: PTFE/EPM (214/425)		

1) Other lining material on request

2) Only for DIN version

3) Body interior Ra ≤ 0.8 µm, exterior Ra ≤ 1.6 µm

4) St 37-2 for DN 125 and 150

5) Version for the food processing industry and for stainless steel body

Table 3 · Temperature ranges for lining and diaphragm materials in °C and °F

Lining	Diaphragms							
	Butyl (300) ¹⁾		FPM/FKM (226)		Ethylene propylene (425) ¹⁾		PTFE/Butyl (214/425) ¹⁾	
	°C	°F	°C	°F	°C	°F	°C	°F
Without	-10 ... 130	14 ... 266	-5 ... 150	23 ... 302	-10 ... 130	14 ... 266	-10 ... 160	14 ... 320
Butyl	-10 ... 110	14 ... 230	-5 ... 110	23 ... 230	-10 ... 110	14 ... 230	-10 ... 110	14 ... 230
ETFE	-10 ... 130	14 ... 266	-5 ... 150	23 ... 302	-10 ... 130	14 ... 266	-10 ... 160	14 ... 320
Ebonite	-10 ... 85	14 ... 185	-5 ... 85	23 ... 185	-10 ... 85	14 ... 185	-10 ... 85	14 ... 185
Enamel	-10 ... 130	14 ... 266	-5 ... 150	23 ... 302	-10 ... 130	14 ... 266	-10 ... 160	14 ... 320

1) Diaphragms with FDA/3A conformity. Suitable for the food processing industry.

Table 4 · K_{Vs} and C_v coefficients and the associated nominal sizes

K _{Vs}		5	7.5	20	31	45	57	100	120	160	190	215	310	410
C _v		6	9	23	36	53	67	115	140	185	220	250	362	480
Travel mm		6	7.5	10		15		22	25	22	25	22	25	60
DN	NPS													
15	½	•												
20	¾		•											
25	1			•										
32	1¼				•									
40	1½					•								
50	2						•							
65	2½							•	•					
80	3									•	•			
100	4										•	•		
125	5												•	
150	6													•

Table 5 · Variables and actuator selection for valves with elastomer diaphragms or diaphragms with PTFE facing
Table 5a · Valve with fail-safe position “Actuator stem extends”

Nominal size		K _{Vs}	C _v	Travel (mm)	Actuator (cm ²)	Bench range (bar)	Elastomer diaphragms				Diaphragm with PTFE facing			
							Operating range (bar)		Reference pressure ¹⁾ (bar) (psi)		Operating range (bar)		Reference pressure ¹⁾ (bar) (psi)	
DN	NPS													
15	½	5	6	6	120	0.4 ... 2.0	0.9 ... 1.6		10	145	1.1 ... 1.8		10	145
20	¾	7.5	9	7.5	120	0.4 ... 2.0	1.4 ... 2.2		9.0	130	-		-	-
						2.1 ... 3.3	2.1 ... 2.7		10	145	2.1 ... 2.7		10	145
						1.4 ... 2.3	-		-	-	1.7 ... 2.2		10	145
25	1	20	23	10	120	2.1 ... 3.3	2.2 ... 3.0		10	145	2.7 ... 3.5		9.0	130
						1.4 ... 2.3	1.8 ... 2.4		8.0	116	1.7 ... 2.3		4.0	58
						240	0.6 ... 3.0		10	145	1.4 ... 3.0		10	145
32	1¼	31	36	10	120	1.4 ... 2.3	1.7 ... 2.3		5.0	72	-		-	-
						240	0.6 ... 3.0		10	145	1.7 ... 3.3		8.5	123
						350	0.4 ... 2.0		-	-	1.3 ... 2.4		10	145
40	1½	45	53	15	240	0.6 ... 3.0	0.9 ... 3.3		4.5	65	-		-	-
						350	0.6 ... 3.0		-	-	1.6 ... 4.0		10	145
							0.4 ... 2.0		10	145	1.1 ... 2.8		5.5	80
50	2	57	67	15	240	0.6 ... 3.0	0.9 ... 3.3		2.5	36	-		-	-
						350	0.4 ... 2.0		10	72	-		-	-
							2.1 ... 3.3		10	145	2.3 ... 3.6		10	145
							0.6 ... 3.0		-	-	1.2 ... 2.4		10	145
65	2½	120	140	25	700	0.6 ... 3.0	1.2 ... 3.2		10	145	1.4 ... 3.4		10	145
						0.6 ... 3.0		-	-	1.3 ... 3.3		8.0	116	
						0.4 ... 2.0		9.0	130	-		-	-	

Nominal size		K _{Vs}	C _V	Travel (mm)	Actuator (cm ²)	Bench range (bar)	Elastomer diaphragms				Diaphragm with PTFE facing		
							Operating range (bar)		Reference pressure ¹⁾ (bar) (psi)		Operating range (bar)		Reference pressure ¹⁾ (bar) (psi)
DN	NPS												
80	3	190	220	25	700	2.6 ... 4.3	–	–	–	2.6 ... 4.0	10	145	
						0.4 ... 2.0	1.1 ... 2.4	4.0	58	–	–	–	
						2.1 ... 3.3	2.2 ... 3.2	10	145	2.1 ... 3.1	7.5	109	
100	4"	215	250	25	700	2.6 ... 4.3	3.1 ... 4.5	10	145	3.2 ... 4.6	8.0	116	
						2.6 ... 4.3	2.6 ... 4.0	8.0	116	2.6 ... 4.0	5.0	72	
						2.1 ... 3.3	2.1 ... 3.1	5.0	72	–	–	–	
125	5	310	360	60	1400	1.3 ... 2.8	1.8 ... 3.3	8.5	123	1.8 ... 3.3	5.0	72	
150	6	410	480		1400	1.3 ... 2.8	1.8 ... 3.3	4.0	58	1.8 ... 3.3	2.0	29	

1) The reference pressure is determined by $\frac{p_1 + p_2}{2} \leq p_{\text{Reference}}$; $p_1, p_2 \leq 10 \text{ bar}_{\text{abs}}$

Table 5b · Valve with fail-safe position "Actuator stem retracts" · Bench range 0.2 ... 1.0 ²⁾

Nominal size		K _{Vs}	C _V	Travel (mm)	Actuator (cm ²)	Operating range (bar)	Minimum required supply pressure (bar) for reference pressure ¹⁾							
							Elastomer diaphragms				Diaphragm with PTFE facing			
DN	NPS						Required supply pressure		Max. operating pressure		Required supply pressure		Max. operating pressure	
							(bar)	(psi)	(bar)	(psi)	(bar)	(psi)	(bar)	(psi)
15	½	6.3	7.5	6	120	0.2 ... 0.55	1.4	20.3	10	145	1.6	23.2	10	145
20	¾	7.5	9	7.5		0.2 ... 0.6	2.1	30.5	10	145	2.3	33.3	10	145
25	1	20	23	10	120	0.2 ... 0.8	2.8	40.6	10	145	3.5	50.7	10	145
					240		1.8	26.1	10	145	2.1	30.5	10	145
240	2.2	31.9	10		145		2.6	37.7	10	145				
350	1.7	24.6	10		145		2.0	29.0	10	145				
40	1½	45	53	15	240	0.2 ... 1.0	2.6	37.7	10	145	3.2	46.4	10	145
					350		2.1	30.5	10	145	2.5	36.2	10	145
240	3.5	50.7	10		145		4.3	62.4	10	145				
350	2.8	40.6	10		145		3.3	47.8	10	145				
700	0.2 ... 0.6	1.5	21.7		10		145	1.8	26.1	10	145			
65	2½	100	115		22		350	0.2 ... 1.5	3.7	53.6	10	145	4.2	60.9
120		140	25	700	0.2 ... 0.9	2.0	29.0	10	145	2.3	33.3	10	145	
80	3	160	185	22	350	0.2 ... 1.5	5.6	81.2	9.5	137.8	5.6	81.2	7.5	108.8
		190	220	25	700	0.2 ... 0.9	3.0	43.5	10	145	3.4	49.3	10	145
100	4	190	220	22	350	0.2 ... 1.5	5.4	78.3	6.0	87.0	5.6	81.2	3.5	50.7
		215	250	25	700	0.2 ... 0.9	3.9	56.5	10	145	4.5	65.3	10	145
							2.4	34.8	4.0	58.0	3.5	50.7	6	87.0
125	5	310	360	60	1400	0.2 ... 1	3.1	44.9	10	145	3.5	50.7	10	145
150	6	410	480				4.5	65.2	10	145	4.3	62.4	7.0	101.5

1) **Note!** The closing pressure may, if at all, only exceed the required supply pressure slightly as the diaphragm service life is impaired otherwise. With positioner plus 0.2 bar.

2) Other spring ranges available on request

Table 6 · Dimensions for Type 3345-1 and Type 3345-7

Valve	DN	15 ¹⁾	20	25	32	40	50	65	80	100	125	150
	NPS	½	¾	1	1¼	1½	2	2½	3	4	5	6
Length L (mm)	DIN flanges	130	150	160	180	200	230	290	310	350	400	480
	ANSI/BS flanges ²⁾	108	117	127	146	159	190	216	254	305	356	406
	Version for food processing industry ³⁾	108	117	127	146	159	190	216	254	305	356	406
H1	mm	210			215	220	225	295	300	355	550	570
H1	Food processing version with stainless steel bonnet	135	140	145	240	245	250	280	290	300	525	540
H2 (mm)	Flange version	48	53	58	70	75	83	88	93	110	123	143

1) Lining for DN 15 only available in enamel

2) The dimension is approx. 6 mm longer for lined valves, and approx. 2 mm longer for coated valves

3) Optionally with threaded or clamp connections or welding ends, see Table 1.

Actuator	cm ²	120	240	350	700	1400
Diaphragm Ø D	mm	168	240	280	390	530
H	700 cm ² and larger including lifting ring	70	62	82	199	287
H3	mm	110			190	610
Thread	mm	M30 x 1.5				M60 x 1.5
α	for Type 3271 Actuator	G ⅛ (⅛ NPT)	G ¼ (¼ NPT)	G ⅜ (⅜ NPT)		G ¾
α2	for Type 3277 Actuator	–	G ⅜ (⅜ NPT)			–

Table 7 · Weights for Type 3345 Valve and actuators

Valve	DN	15	20	25	32	40	50	65	80	100	125	150
	NPS	½	¾	1	1¼	1½	2	2½	3	4	5	6
Cast body without actuator (kg)		5	6	7	10	12	16	23	34	49	70	95

Actuator	cm ²	120	240	350	700	1400
Type 3271	Approx. kg	2	5	8	22	70
Type 3277	Approx. kg	3.2	9	12	26	–

