

SAFETY VALVES		Nominal inside diameter										
Recording number	Name	10	15	25	40	50	65	80	100	125	150	200
P12 217 040	Spring loaded safety valve, low-lift, stainless			X		X		X	X			
P12 217 040C	Spring loaded safety valve, low-lift, stainless, to -196 °C			X								
P12 287 040C	Spring loaded safety valve, low-lift, pinned, stainless steel to -196 °C			X								
P14 217 5250	Spring loaded safety valve, low-lift, gas-proof		X	X	X							
P14 217 5400	Spring loaded safety valve, low-lift, gas-proof	X	X	X								
P14 287 5100	Spring loaded safety valve, low-lift, gas-proof, pinned		X									
P14 287 5250	Spring loaded safety valve, low-lift, gas-proof, pinned		X									
P15 217 540	Spring loaded safety valve, open			X	X	X	X	X	X	X		
P15 217 616	Spring loaded safety valve, open			X	X	X	X	X	X			
P16 217 540	Spring loaded safety valve, normal, gas-proof			X	X	X	X	X	X	X		
P16 217 616	Spring loaded normal safety valve, gas-proof			X	X	X	X	X	X			
P24 217 540	Spring loaded proportional safety valve, gas-proof			X	X	X	X	X	X			
P24 217 616	Spring loaded proportional valve, gas-proof			X	X	X	X	X	X			
P26 217 540	Spring loaded normal safety valve, gas-proof			X	X	X	X	X	X			
P26 217 616	Spring loaded normal safety valve, gas-proof			X	X	X	X	X	X			
P51 217 525	Spring loaded safety valve, full-lift, open from -60 °C to 400 °C											X
P51 217 540	Spring loaded safety valve, full-lift, open from -60 °C to 400 °C			X	X	X	X	X	X	X	X	
P51 217 5100	Spring loaded safety valve, full-lift, open from -60 °C to 400 °C			X	X	X	X	X	X			
P51 217 225	Spring loaded safety valve, full-lift, from alloy steel											X
P51 217 240	Spring loaded safety valve, full-lift, from alloy steel			X	X	X	X	X	X	X	X	
P51 217 2100	Spring loaded safety valve, open, from alloy steel			X	X	X	X	X	X			
P51 217 525	Spring loaded safety valve, open from -10 °C till 200 °C											X
P51 217 540	Spring loaded full-lift, open from -10 °C till 200 °C			X	X	X	X	X	X	X	X	
P51 217 5100	Spring loaded safety valve, full-lift, from -10 °C to 200 °C			X	X	X	X	X	X			
P51 217 525	Spring loaded safety valve, full-lift, open from -10 °C to 400 °C											X
P51 217 540	Spring loaded safety valve, open from -10 °C to 400 °C			X	X	X	X	X	X	X	X	
P51 217 5100	Spring loaded safety valve, open from -10 °C to 400 °C			X	X	X	X	X	X			
P52 217 525	Spring loaded safety valve, full-lift, gas-proof, from -60 °C to 400 °C											X
P52 217 540	Spring loaded safety valve, full-lift, gas-proof, from -60 °C to 400 °C			X	X	X	X	X	X	X	X	
P52 217 5100	Spring loaded safety valve, full-lift, gas-proof, from -60 °C to 400 °C			X	X	X	X	X	X			
P52 217 040C	Spring loaded safety valve, full-lift, gas-proof, stainless, till -196°C			X								
P52 287 040C	Spring loaded safety valve, full-lift, gas-proof, pinned from stainless, till -196 °C			X								
P52 217 525	Spring loaded safety valve, full-lift, gas-proof, from -10 °C to 200 °C											X
P52 217 540	Spring loaded safety valve, full-lift, gas-proof, from -10 °C to 200 °C			X	X	X	X	X	X	X	X	
P52 217 5100	Spring loaded safety valve, full-lift, gas-proof, from -10 °C to 400 °C			X	X	X	X	X	X			
P52 217 525	Spring loaded safety valve, full-lift, gas-proof, from -10 °C to 400 °C											X
P52 217 540	Spring loaded safety valve, full-lift, gas-proof, from -10 °C to 400 °C			X	X	X	X	X	X	X	X	
P52 217 5100	Spring loaded safety valve, full-lift, gas-proof, from -10 °C to 400 °C			X	X	X	X	X	X			
P54 217 540	Spring loaded safety valve, normal for liquids			X	X	X	X	X	X			
P57 217 240	Spring loaded safety valve, full-lift, open			X	X	X	X	X	X	X	X	
P57 217 2100	Spring loaded safety valve, full-lift, open			X	X	X	X	X				
P57 217 540	Spring loaded safety valve, full-lift, open			X	X	X	X	X	X	X	X	
P57 217 5100	Spring loaded safety valve, full-lift, gas-proof			X	X	X	X	X				
P58 217 540	Spring loaded safety valve, full-lift, open			X	X	X	X	X	X	X	X	
P58 217 5100	Spring loaded safety valve, full-lift, open			X	X	X	X	X				
P80 147 516	Spring loaded safety valve, full-lift, gasproof					X						

On an order we produce executions:

.NT ...for low temperatures from -50°C

.TR ...tropico – the surface treatment into more difficult conditions

.KY ...for oxygen

RECORDING NUMBER SCHEME

P51 217 540.20

GROUP DESIGNATION

- C - special valves and fittings
- D - separators, filters, traps
- L - flap valves
- P - safety valves
- R - regulators (controllers)
- S - gate valves
- V - shut-off and control valves
- Z - check valves
- F - filters
- RO - axial reducing valves
- BR - safety axis quick-closing valves
- RT - pressure regulators
- EP - gas preheaters

TYPE SERIAL NUMBER

CODE OF FLOW DIRECTION

- 1 - straight
- 2 - angle
- 4 - three-way
- 5 - four-way
- 0 - without resolution

CODE OF CONNECTION TYPE

- 1 - flanged
- 2 - welding on
- 3 - threaded
- 5 - with pipe union
- 7 - flange-less
- 8 - tenon-jointed

SUPPLEMENTARY SIGN

NOMINAL PRESSURE PN

MATERIAL CODE

- 1 - nodular cast iron
- 2 - alloy steel for castings
- 3 - alloy forged steel, pressed
- 4 - carbon forged steel, pressed
- 5 - carbon steel for castings
- 6 - grey cast iron
- 7 - zinc alloy
- 8 - light metals
- 9 - plastic, rubber (also lining)
- 0 - stainless steel

CODE OF OPERATING MODE

- 1 - handwheel
- 2 - gears
- 3 - electric actuating mechanism
- 4 - pneumatic actuator
- 5 - arranged for actuators
- 7 - self-acting (automatic)
- 8 - without control
- 9 - with accessory control



SAFETY VALVES

brief characteristics, calculations

INTRODUCTION

These standards or regulations are related to the safety valves:

- in CZ - ČSN 13 43 09
- in BRD - Merkblatt Sicherheitsventil 100 AD Merkblatt A2

Basic definitions of the safety valve:

The safety valve is a valve fittings which prevents exceeding specified overpressure by an automatic opening and which after a overpressure drop it is automatically closed.

Pressure definitions:

p_n - working pressure of the equipment

p_o - opening pressure of the safety valve

It is recommended to choose the opening pressure owing to the working pressure so that the working pressure of the equipment is lower:

- of 8% at safety open valves
- of 10% at other safety valves for gases and vapours
- of 20% at the safety valves for fluids or at a place where it occurs a pulsation from pumps or kompressors.

SAFETY VALVES TYPES UNDER ITS FUNCTION

1. Safety valve, low-lift - it has on a cone seat no additional surface which would cause a lift increase
2. Normal safety valve - it attains a nominal lift at determined enhancement of the opening pressure without a requirement on a functional characteristic
3. Safety valve, full-lifted - it has a full lift, an open surface between seats is greater than the minimum flow area. The lift is attained at a specified rise by means of jumps.
4. Proportional safety valve - it opens nearly proportionally in the dependence of a pressure increase.

PROBLEMS OF A CLOSURE TIGHTNESS

The quality of sealing surfaces of the safety ventil closure is one from key requirements. It results in particular from the fact that the sealing pressure in the seats is closely before the attainment of the opening pressure lower than the sealed working pressure of the equipment.

For securing of the tightness it is necessary to observe maximum demands on

- a surface roughness of the seats (lapping)
- a seat planeness
- a working fluid purity (without mechanical impurities)
- an arrangement of the filters in distributions

CAUSES OF VIBRATION OF MOVABLE PARTS AT BLOWING AWAY

1. An outflow of the safety valve is much higher than the outflow - it is necessary to check by calculation.
2. A pressure loss in the outlet piping is higher than 3% of the opening pressure.
3. The pressure loss in the outlet piping is higher than is allowed by the manufacturer of the safety valve.
4. A spring was used for a lower opening pressure than is allowed by the manufacturer of the safety valve.
5. Vibration causes can be also a combination of causes above mentioned.

CALCULATION OF OUTFLOW AND PRESSURE LOSS

1. For the outflow calculation it is possible to use these foundations:

- ČSN 13 43 09 - 3
- the calculation program that can be demanded from the producer of the safety valves

2. Příklad pro výpočet tlakové ztráty v přívodním potrubí k pojistnému ventilu:

Příklad

Pojistný ventil P51 217 5100/400 °C - DN 50

$$A_o = 804 \text{ mm}^2, \alpha_w = 0,78$$

Pracovní látka: sytá vodní pára; $p_o = 4,7 \text{ MPa (g)}$.

Určit tlakovou ztrátu Δp_z v rovném přívodním potrubí, vnitřní průměr $D_1 = 50 \text{ mm}$, délka $L = 1\,000 \text{ mm}$, součinitel tření vnitřní stěny potrubí $\lambda = 0,02$ (nutno uvážit: drsnost stěny potrubí se může během provozu značně zvětšit (korose, nárůst)).

Skutečný výtokový součinitel a (ČSN 13 43 09 - 1, čl. 2.4.19 a 2.4.20):

$$\alpha = \frac{\alpha_w}{0,9} = \frac{0,78}{0,9} = 0,867$$

Tlak na vstupu poj. ventilu (ČSN 13 43 09 - 3, čl. 2.2 a ČSN 13 43 09 - 2, čl. 3.3.2.b):

$$p_1 = 1,06 \cdot p_o + 0,1 = 1,06 \cdot 4,7 + 0,1 = 5,082 \text{ MPa (abs)}$$

Skutečný výtok - vztah (5) ČSN 13 43 09 - 3 upravíme:

$$Q_s = 5,25 \cdot A_o \cdot a \cdot p_1 = 5,25 \cdot 804 \cdot 0,867 \cdot 5,082 = 18\,598 \text{ kg/h}$$

$$Q_s = 18\,598 \text{ kg/h} = 5,17 \text{ kg/s}$$

Rychlost w proudění páry v přívodním potrubí:

$$A_1 = \frac{\pi}{4} D_1^2 = \frac{\pi}{4} \cdot 50^2 = 1963,5 \text{ mm}^2 = 0,00196 \text{ m}^2$$

Z parních tabulek vyplývá pro sytou páru $p_1 = 5,082 = 5,1 \text{ MPa (abs)}$ měrný objem páry: $v_1 = 0,03863 \text{ m}^3/\text{kg}$, pak :

$$w = \frac{Q_s [\text{kg/s}] \cdot v_1 [\text{m}^3/\text{kg}]}{A_1 [\text{m}^2]} = \frac{5,17 \cdot 0,03863}{0,00196} = 101,9 \text{ m/s}$$

Ztrátový součinitel přívodního potrubí ζ :

$$\zeta_1 = 0,5 \dots \text{ostrohranný vstup}$$

$$\zeta_2 = \lambda \cdot \frac{L}{D_2} = 0,02 \cdot \frac{1000}{50} = 0,4$$

$$\zeta = \zeta_1 + \zeta_2 = 0,5 + 0,4 = 0,9$$

Tlaková ztráta v přívodním potrubí:

$$\Delta p_z = \zeta \cdot \frac{w^2 (\text{m/s})^2}{2 \cdot v_1 (\text{m}^3/\text{kg})} = 0,9 \cdot \frac{101,9^2}{2 \cdot 0,03863} = 120958 \text{ kg/ms}^2 = 120,9$$

$$\Delta p_z = 0,121 \text{ MPa}$$

Tlaková ztráta v přívodním potrubí v % otevíracího tlaku:

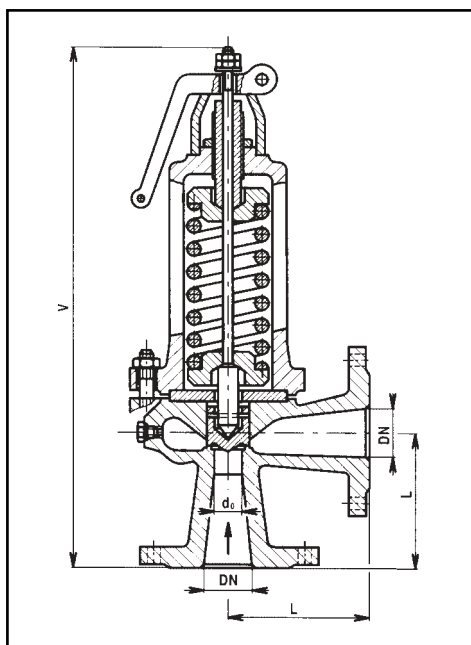
$$p_o = 4,7 \text{ MPa (g)}$$

$$\Delta p_z [\%] = \frac{\Delta p_z [\text{MPa}]}{p_o [\text{MPa}]} \cdot 100 = \frac{0,121}{4,7} \cdot 100 = 4,47\%$$

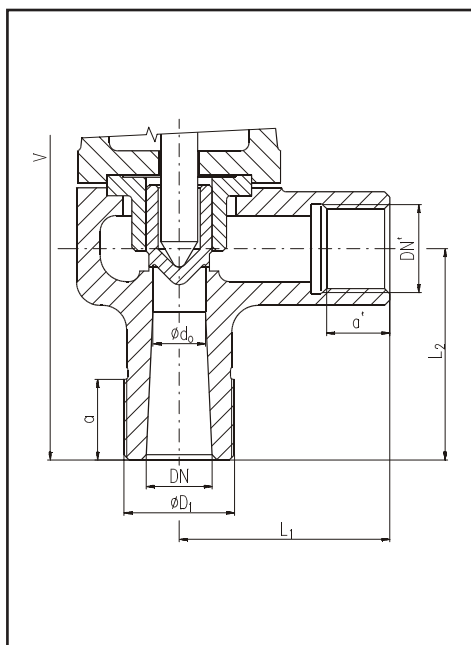
$\Delta p_z = 4,47\%$ otevíracího tlaku, ČSN 13 43 09 - 2 čl. A.1 předepisuje 3%

4,47% > 3% ... nutno upravit přívodní potrubí (čl. A.3 ČSN 13 43 09 - 2).

SAFETY VALVE



P12 217 040



P12 287 040

CONSTRUCTIONAL EXECUTION

Low-lift, open, spring, angle, flanged/threaded.

APPLICATION

For securing pressure vessels against an unallowable rise of the working overpressure, for aggressive gases and vapours and aggressive liquids with a kinematic viscosity to $10 \text{ mm}^2\text{s}^{-1}$.

Application:

- petrochemical industry
- selected fields of a chemical industry
- pressure equipments in the industry

TYPES / DN / PN / TEMPERATURES

P12 217 040	DN25÷100	PN40	-10 to 300 °C
P12 217 040	DN25÷100	PN40	-50 to 300 °C
P12 217 040C	DN25	PN40	-196 to 300 °C
P12 287 040C	DN25	PN40	-196 to 300 °C

OTHER

Guaranteed discharge coefficients:

	Gases and vapours	Liquids
α_w [-]	0,09	0,05

FUNCTION

It is the safety valve, low-lift, with functional properties according to the ČSN 13 4309. This valve is not specified for the outlet into counterpressure. At the opening of the safety valve a part of the working substance can escape round the spring in a free space. The pressure loss in the outlet piping can be max. 3% of the opening pressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

PN	Temperature [°C]					
	-196	-50	-10	100	200	300
	Maximum working overpressure [bar]					
40	40	40	40	40	40	32

DIMENSION TABLE

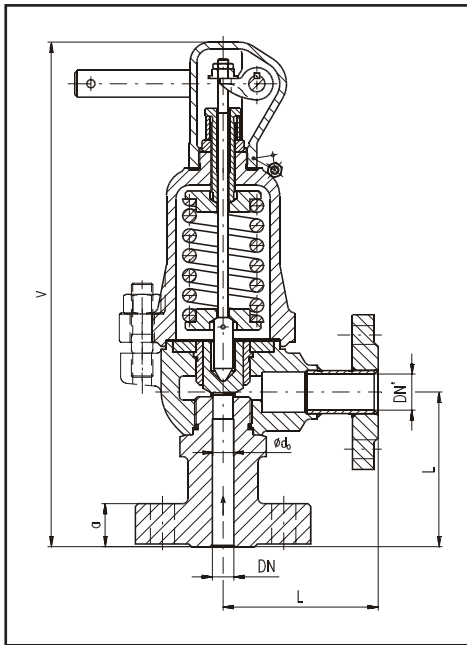
Type designation	P12 217 040, P12 217 040C				P12 287 040C	
PN inlet / PN' outlet	40 / 6					
DN inlet / DN' outlet	25 / 25	50 / 50	80 / 80	100 / 100	25 / G1"	
ϕd_o [mm]	20	40	70	90	20	
L [mm]	80	115	155	175	----	
ϕD_1 [mm]	----	----	----	----	M42x2	
L ₁ [mm]	----	----	----	----	80	
L ₂ [mm]	----	----	----	----	80	
a [mm]	----	----	----	----	35	
a' [mm]	----	----	----	----	24	
V [mm]	295	425	435	732	220	
m [kg]	7	16	40	64	7	
Opening pressure	p _{omin} [bar]	0,29	0,39	0,39	0,29	0,29
	p _{omax} [bar]	38	39	39	24	38

MATERIAL AND CONNECTION

	P12 217 040 (-10 to 300 °C)	P12 217 040 (-50 to 300 °C)	P12 217 040C	P12 287 040C
Body	ČSN 42 2942.1	ČSN 42 2933.1	ČSN 42 2933.4	
Yoke				
Cover (lid)	ČSN 42 2420			
Cone	AUSTENITIC STAINLES STEEL			
Spring	SPRING STEEL		AUSTENITIC STAINLES STEEL	
Connection	ČSN 13 1160			SEE THE DIMENSION TABLE

Note: Dimensions of connecting flanges see pages 114 and 115.

SAFETY VALVE



P14 217 5250

CONSTRUCTIONAL EXECUTION

Low-lift, gasproof, spring, angle, flanged/threaded.

POUŽITÍ

For securing pressure vessels and other pressure devices against unallowable rise of the working overpressure, for non-aggressive gases and vapours and non-aggressive fluids with the kinematic viscosity to $10 \text{ mm}^2\text{s}^{-1}$.

Application:

- Pressure devices in the industry
- Energetics (power engineering)

TYPES / DN / PN / TEMPERATURES

P14 217 5250	DN15÷40	PN250	-10 to 300 °C
P14 217 5400	DN10÷25	PN400	-10 to 200 °C
P14 287 5100	DN15	PN100	-10 to 300 °C
P14 287 5250	DN15	PN250	-50 to 300 °C
P14 287 5100	DN15	PN100	-50 to 300 °C
P14 287 5250	DN15	PN250	-10 to 300 °C

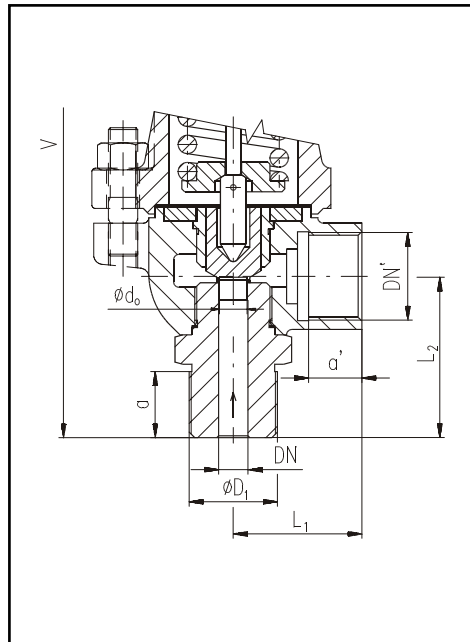
ADMISSIBLE PRESSURES AND TEMPERATURES

Typ	PN	Temperature [°C]					
		-50	-10	100	200	250	300
Maximum working overpressure [bar]							
P14 287 5100	100	100	100	100	100	90	80
P14 287 5250	250	250	250	250	250	225	200
P14 217 5250	250	-	250	250	250	225	200
P14 217 5400	400	-	400	400	400	-	-

DIMENSION TABLE

Type designation		P14 217 5250			P14 217 5400			P14 287 5100	P14 287 5250
PN inlet / PN' outlet		250 / 25			400 / 25			100 / 25	250 / 25
DN inlet / DN' outlet		15 / 25	25 / 40	40 / 50	10 / 25	15 / 40	25 / 50	15 / G1"	15 / G11/2"
ϕd_0 [mm]		15	20	30	10	14	20	15	15
L [mm]		115	130	155	115	130	155	-	-
a [mm]		-	-	-	30	34	38	35	40
ϕD_1 [mm]		-	-	-	-	-	-	M42x2	M48x2
L ₁ [mm]		-	-	-	-	-	-	70	70
L ₂ [mm]		-	-	-	-	-	-	82	88
a' [mm]		-	-	-	-	-	-	29	29
V [mm]		373	515	625	373	515	625	258	258
m [kg]		13	29	43	13	29	43	9,5	10
α_w [-]	Gases and vapours	0,03	0,09	0,09	0,03	0,03	0,09	0,03	
	Liquids	0,03	0,05	0,05	0,03	0,03	0,05		
Opening pressure	p _{omin} [bar]	21,6	26,5	39,2	98	98	58,8	3,4	21,6
	p _{omax} [bar]	245	245	187	392	392	382	98	245

SAFETY VALVE



P14 287 5100

FUNCTION

It is the safety valve, low-lift, with functional properties according to the ČSN 13 4309. This valve is not specified for the outlet into the counterpressure. The pressure loss in the outlet pipeline can be max.:

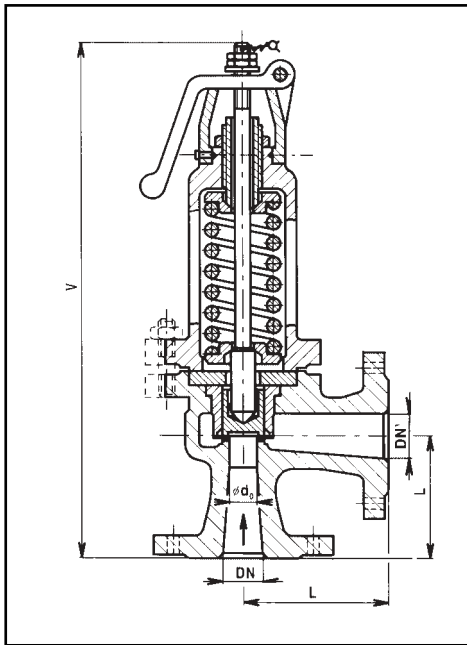
for PN100 10% of the opening pressure
for PN250 6% of the opening pressure
for PN400 4% of the opening pressure

MATERIAL AND CONNECTION

	P14 217 5250, 5400 P14 287 5100, 5250	P14 287 5100/300°C/-50°C P14 287 5250/300°C/-50°C
Body	ČSN 42 2643.1	ČSN 42 2643.9
Cover		
Lid	ČSN 42 2420	
Cone	STAINLESS STEEL	
Spring	SPRING STEEL	
Connection	ČSN 13 1160	

Note: Dimensions of connecting flanges see pages 114, 115.

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Normal, open, spring, angled, flanged.

APPLICATION

For securing pressure vessels and other pressure devices against unallowable rise of the working overpressure, for non-aggressive gases and vapours and non-aggressive fluids with the kinematic viscosity to 400 mm²s⁻¹.

Application:

- pressure devices in the industry

TYPES / DN / PN / TEMPERATURES

P15 217 540	DN25÷125	PN40	-10 to 300 °C
P15 217 540	DN25÷125	PN40	-50 to 300 °C
P15 217 616	DN25÷100	PN16	0 to 200 °C

REST

Guaranteed discharge coefficients:

	Gases and vapours	Liquids
α_w [-]	0,25	

FUNCTION

It is the safety normal valve with functional properties according to the ČSN 13 4309. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure. This valve is not specified for the outlet into the counterpressure. At the opening of the safety valve the part of the working pressure can escape through a space round the spring in a free space.

ADMISSIBLE PRESSURES AND TEMPERATURES

Type	PN	Temperature [°C]					
		-50	-10	0	100	200	300
Maximum working overpressure [bar]							
P15 217 616	16	-----	-----	16	16	12,8	-----
P15 217 540	40	40	40	40	40	40	30,9

MATERIAL AND CONNECTION

	P15 217 540 -10 °C to 300 °C	P15 217 540 -50 °C to 300 °C	P15 217 616
Body	ČSN 42 2643	ČSN 42 2643.9	ČSN 42 2420
Cover			
Lid	ČSN 42 2420		
Cone	HARDENING STAINLES STEEL		
Spring	SPRING STEEL		
Connection	INLET PN40 acc. to ČSN 13 1160 OUTLET PN16 acc. ČSN 13 1160		INLET PN16 acc. ČSN EN 1092-3 OUTLET PN10 acc. ČSN EN 1092-2

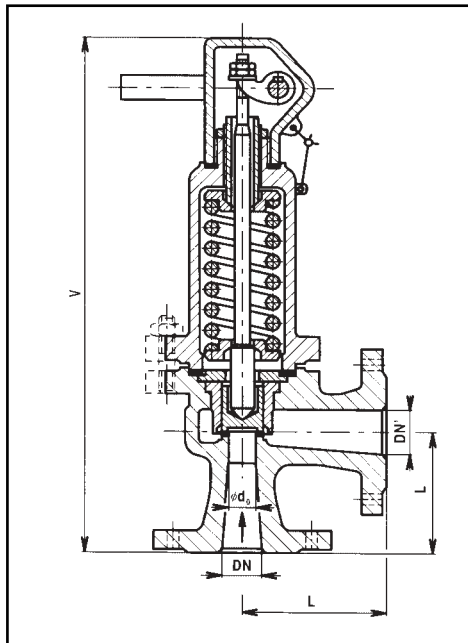
Note: Dimensions of connecting flanges see pages 114 and 115.

DIMENSION TABLE

PN inlet / PN outlet DN inlet / DN outlet	40 / 16 , 16 / 10						
	25 / 25	40 / 40	50 / 50	65 / 65	80 / 80	100 / 100	125 / 125
ϕd_o [mm]	20	32	40	56	70	90	100
L [mm]	90	110	125	145	155	175	200
V [mm]	365	505	530	650	750	790	905
P15 217 540 m [kg]	9	20,5	24,5	44	63	73	106,5
P15 217 616 m [kg]	9	21	25	43	59	68	-----
P15 217 540	p_{min} [bar]	0,3					
	p_{max} [bar]	40				25	24
P15 217 616	p_{min} [bar]	0,3					
	p_{max} [bar]	16					

Note: DN125 is valid only for P15 217 540.

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Normal, gasproof, spring, angled, flanged.

APPLICATION

For the securing pressure vessels and other pressure equipments against an unallowable rise of the working overpressure, for non-aggressive gases and vapours besides a water steam.

Application:

- pressure equipments in the industry

TYPES / DN / PN / TEMPERATURES

P16 217 540	DN25÷125	PN40	-10 to 300 °C
P16 217 540	DN25÷125	PN40	-50 to 300 °C
P16 217 616	DN25÷100	PN16	0 to 200 °C

REST

Guaranteed discharge coefficients:

	Gases and vapours
α_v [-]	0,25

FUNCTION

It is the safety normal valve with functional properties according to the ČSN 13 4309. If the safety valve blows off to the counterpressure, it can be max. 25% of the opening pressure. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

Typy	PN	Temperature [°C]					
		-50	-10	0	100	200	300
		Maximum working overpressure [bar]					
P16 217 616	16	-----	-----	16	16	12,8	-----
P16 217 540	40	40	40	40	40	40	30,9

MATERIAL AND CONNECTION

	P16 217 540 -10 °C to 300 °C	P16 217 540 -50 °C to 300 °C	P16 217 616
Body	ČSN 42 2643	ČSN 42 2643.9	ČSN 42 2420
Cover			
Lid	ČSN 42 2420		
Cone	STAINLES STEEL		
Spring	SPRING STEEL		
Connection	INLET PN40 ČSN 13 1160 OUTLET PN16 ČSN 13 1160		INLET PN40 ČSN 13 1160 OUTLET PN16 ČSN 13 1160

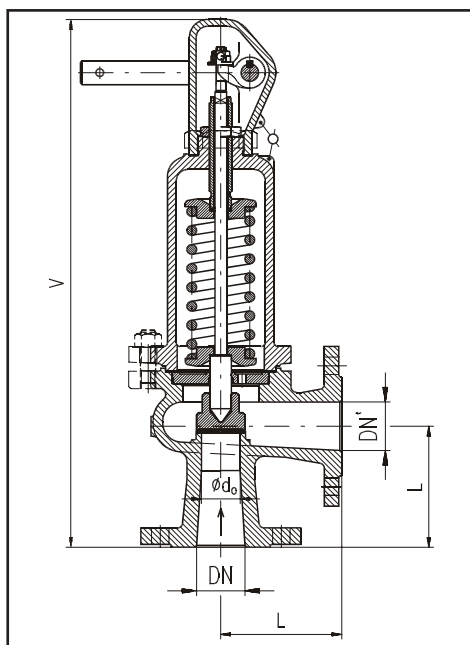
Note: Dimensions of connecting flanges see pages 114 and 115.

TABULKA ROZMĚRŮ

PN inlet / PN outlet		40 / 16, 16 / 10						
DN inlet / DN outlet		25 / 25	40 / 40	50 / 50	65 / 65	80 / 80	100 / 100	125 / 125
ϕd_o [mm]		20	32	40	56	70	90	100
L [mm]		90	110	125	145	155	175	200
V [mm]		375	520	545	675	770	810	950
P16 217 540	m [kg]	10,5	24	28	50	70	80	115
P16 217 616	m [kg]	10	24	28	47	65	75	-----
P16 217 540	p_{min} [bar]	0,3						
	p_{max} [bar]	40				25		24
P16 217 616	p_{min} [bar]	0,3						
	p_{max} [bar]	16						-----

Note: DN125 is valid only for P16 217 540.

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Proportional, gasproof, spring, angled, flanged.

APPLICATION

For the securing pressure vessels and other pressure equipments against unallowable rise of the working overpressure, for non-aggressive gases and vapours and non-aggressive fluids with the kinematic viscosity to $10 \text{ mm}^2\text{s}^{-1}$.

Application

- pressure equipments in the industry
- energetics (power engineering)
- heating systems

TYPES / DN / PN / TEMPERATURES

P24 217 540	DN25÷100	PN40	-10 to 300 °C
P24 217 540	DN25÷100	PN40	-50 to 300 °C
P24 217 616	DN25÷100	PN16	0 to 200 °C

REST

Guaranteed discharge coefficients:

p _o [bar]	α _v [-]	
	Gases and vapours	Liquids
0,3 + 0,6	0,044	0,053
0,7 + 1	0,060	
1,1 + 1,4	0,068	
≥1,5	0,073	

FUNCTION

It is the safety proportional valve with functional properties according to the AD Merkblatt A2 and also according to the ČSN 13 4309. If the safety valve blows off to the counterpressure, it can be max. 25% of the opening pressure. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

Type	PN	Temperature [°C]					
		-50	-10	0	100	200	300
Maximum working overpressure [bar]							
P24 217 616	16	-----	-----	16	16	12,8	-----
P24 217 540	40	40	40	40	40	35	28

MATERIAL AND CONNECTION

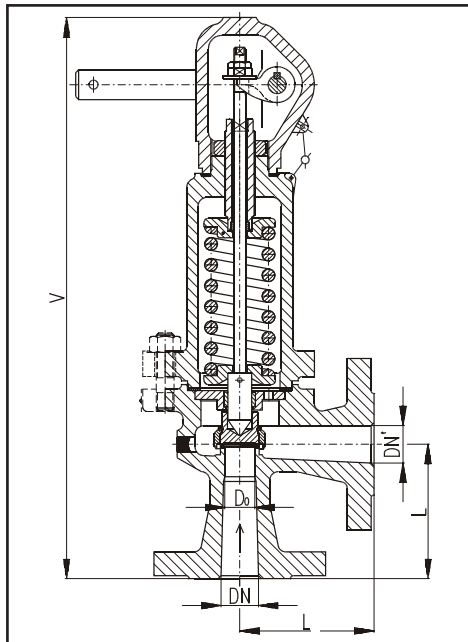
	P24 217 540 -10 °C to 300 °C	P24 217 540 -50 °C to 300 °C	P24 217 616
Body	1.0619 N	ČSN 4226 43.9	GG 25
Cover			
Lid			
Cone	STAINLES STEEL		
Spring	SPRING STEEL		
Connection	INLET PN40 acc. to ČSN 13 1160 OUTLET PN16 acc. to DIN 2543	ČSN 13 1160	INLET PN16 ČSN EN 1092-2 OUTLET PN10 ČSN EN 1092-2

Note: Dimensions of connecting flanges see pages 114 and 115.

DIMENSION TABLE

PN inlet / PN outlet DN inlet / DN outlet	40 / 16 16 / 10					
	25 / 25	40 / 40	50 / 50	65 / 65	80 / 80	100 / 100
φ d _o [mm]	20	32	40	56	70	90
L [mm]	90	110	125	145	155	175
V [mm]	375	520	545	675	770	810
P24 217 540 m [kg]	10,5	26	28	45	65	80
P24 217 616 m [kg]	10,5	24	28	38	62	75
P24 217 540	p _{omin} [bar]	0,3				
	p _{omax} [bar]	40				25
P24 217 616	p _{omin} [bar]	0,3				
	p _{omax} [bar]	16				

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Standard, gasproof, spring, angled, flanged.

APPLICATION

For the securing the pressure vessels and other pressure equipments against unallowable rise of the working overpressure for non-aggressive gases and vapours and non-aggressive fluids with the kinematic viscosity to $10 \text{ mm}^2\text{s}^{-1}$.

Application:

- pressure equipments in the industry
- energetics (power engineering)
- heating systems

TYPES / DN / PN / TEMPERATURES

P26 217 540	DN25÷100	PN40	-50 to 300 °C
P26 217 616	DN25÷100	PN16	0 to 200 °C

REST

Guaranteed discharge coefficients:

	Gases and vapours	Liquids
$\alpha_w [-]$	0,25	0,25

FUNKCE

It is the standard safety valve with functional properties according to the AD Merkblatt A2 and also according to the ČSN 13 4309. If the safety valve blows off to the counterpressure, it can be max. 25% of the opening pressure. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

Type	PN	Temperature [°C]					
		-50	-10	0	100	200	300
		Maximum working overpressure [bar]					
P26 217 616	16	-----	-----	16	16	12,8	-----
P26 217 540	40	40	40	40	40	35	28

MATERIAL AND CONNECTION

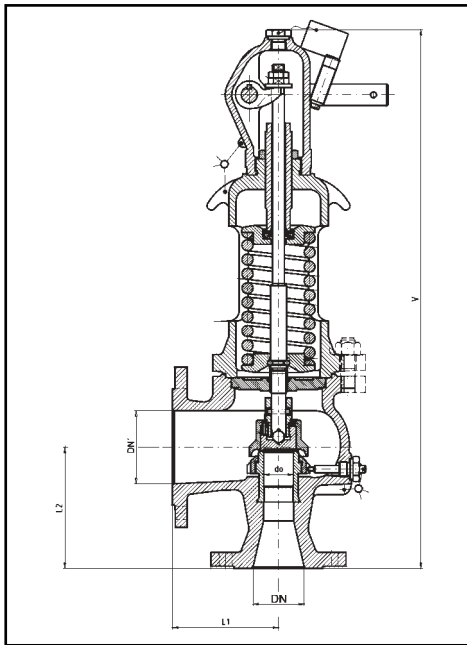
	P26 217 540 -10 °C to 300 °C	P26 217 540 -50 °C to 300 °C	P26 217 616
Body	1.0619 N	ČSN 4226 43.9	GG 25
Cover			
Lid			
Cone	STAINLES STEEL		
Spring	SPRING STEEL		
Connection	INLET PN40 acc. to ČSN 13 1160 OUTLET PN16 acc. to DIN 2543	ČSN 13 1160	INLET PN16 ČSN EN 1092-2 OUTLET PN10 ČSN EN 1092-2

Note: Dimensions of connecting flanges see pages 114 and 115.

DIMENSION TABLE

PN inlet / PN outlet DN inlet / DN outlet	40 / 16 16 / 10					
	25 / 25	40 / 40	50 / 50	65 / 65	80 / 80	100 / 100
ϕd_o [mm]	20	32	40	56	70	90
L [mm]	90	110	125	145	155	175
V [mm]	375	520	545	675	770	810
P26 217 540 m [kg]	10,5	26	28	45	65	80
P26 217 616 m [kg]	10,5	24	28	38	62	75
P26 217 540	p_{min} [bar]	0,3				
	p_{max} [bar]	40				25
P26 217 616	p_{min} [bar]	0,3				
	p_{max} [bar]	16				

SAFETY VALVE



without an adapter

CONSTRUCTIONAL EXECUTION

Full-lifted, open, spring, angled, flanged.

APPLICATION

For the securing the pressure vessels, boilers and other pressure devices against an unallowable rise of the working overpressure, for non-aggressive gases and vapours or steams.

Application:

- pressure equipments in the industry
- energetics (power engineering)

TYPES / DN / PN / TEMPERATURES

P51 217 225	DN200	PN25	-10 to 550 °C	with adapter
P51 217 240	DN25÷150	PN40	-10 to 550 °C	with adapter
P51 217 2100	DN25÷100	PN100	-10 to 550 °C	with adapter
P51 217 525	DN200	PN25	-60 to 400 °C	with adapter
P51 217 540	DN25÷150	PN40	-60 to 400 °C	with adapter
P51 217 5100	DN25÷100	PN100	-60 to 400 °C	with adapter
P51 217 525	DN200	PN25	-10 to 200 °C	without ad.
P51 217 540	DN25÷150	PN40	-10 to 200 °C	without ad.
P51 217 5100	DN25÷100	PN100	-10 to 200 °C	without ad.
P51 217 525	DN200	PN25	-10 to 400 °C	with adapter
P51 217 540	DN25÷150	PN40	-10 to 400 °C	with adapter
P51 217 5100	DN25÷100	PN100	-10 to 400 °C	with adapter

ADMISSIBLE PRESSURES AND TEMPERATURES

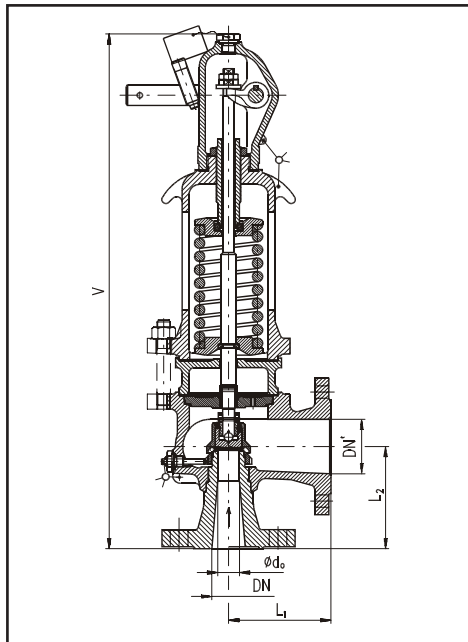
Standard	Types	PN	Temperature [°C]						
			-60	-10	200	300	400	500	550
Maximum working overpressure [bar]									
ČSN	P51 217 225	25	----	25	25	25	25	24,2	12,9
	P51 217 240	40	----	40	40	40	40	38,7	20,6
	P51 217 2100	100	----	100	100	100	100	96,8	51,6
	P51 217 525	25	25	25	22,3	19,5	18	----	----
	P51 217 540	40	40	40	35,8	31,3	28,8	----	----
DIN	P51 217 5100	100	100	100	89,5	78,2	72,1	----	----
	P51 217 525	25	----	25	22	17	13	----	----
	P51 217 540	40	----	40	35	28	21	----	----
	P51 217 5100	100	----	100	80	60	50	----	----

MATERIAL AND CONNECTION

	P51 217 225, 240, 2100 -10 °C ÷ 550 °C	P51 217 525, 540, 5100 -60 °C ÷ 400 °C	P51 217 525, 540, 5100 -10 °C ÷ 400 °C	P51 217 525, 540, 5100 -10 °C ÷ 200 °C
Body	15 128.5 ČSN 42 2744.5	17 248.4 ČSN 42 2714.9	1.0619 N	1.0619 N
Cover	ČSN 42 2643.1	ČSN 42 2714.9		
Lid	ČSN 42 2420	ČSN 42 2420	GG 25	GG 25
Cone	STAINLES STEEL			
Spring	SPRING STEEL			
Connection	ČSN 13 1160	ČSN 13 1160	DIN 2543, 2544, 2545, 2547	DIN 2543, 2544, 2545, 2547

Note: Dimensions of connecting flanges see pages 114 and 115.

SAFETY VALVE



FUNCTION

It is the safety valve, full-lift, with functional properties according to the AD Merkblatt A2 and the ČSN 13 4309. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure. This valve is not specified for the outlet into the counterpressure. At the opening of the safety valve the part of the working substance can escape through a space round the spring into a free space. From the point of view of the function there are these executions of the safety valves:

Execution .10 , .11 - the safety valve, full-lift, with a full lift

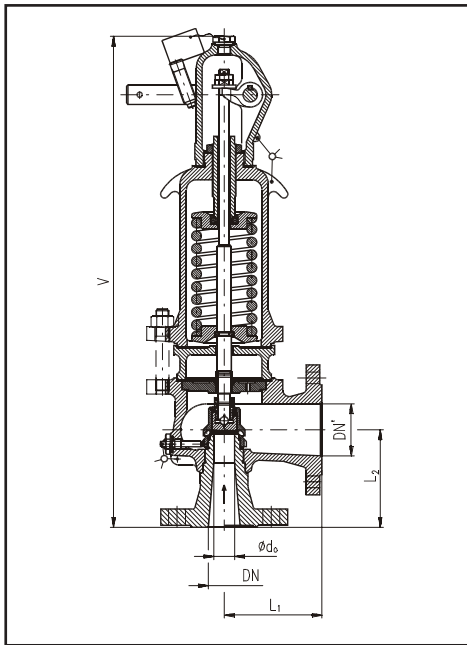
Execution .20 , .21 - the safety valve, full-lift, with a limited lift

with an adapter

DIMENSION TABLE

PN inlet / PN`outlet		25/10	40/16							100/25							
DN inlet / DN` outlet		200/300	25/40	40/65	50/80	65/100	80/125	100/150	125/200	150/250	25/40	40/65	50/80	65/100	80/125	100/150	
ϕd_o [mm]		120	15	25	32	40	50	60	80	100	15	25	32	40	50	60	
L ₁ [mm]		330	100	120	125	145	170	210	250	290	110	130	150	155	205	210	
L ₂ [mm]		290	105	130	145	150	180	200	230	270	120	140	150	165	185	200	
V [mm]		1370	440	660	670	720	870	1000	1140	1340	440	660	700	850	960	1090	
V _{adapter} [mm]		1410	480	710	720	770	940	1070	1210	1410	480	710	750	920	1030	1160	
m [kg]		287	16	29	34	50	76	111	175	262	17	31	49	64	100	130	
m _{adapter} [kg]		300	17	30	36	53	80	117	185	275	18	32	52	68	106	140	
max. α_w [-]	Execution .10, .11	0,78															
	Execution .20, .21	0,67	0,51	0,67						0,51		0,67					
Opening pressure	P _{omin} [bar]	0,5										20					
	P _{omax} [bar]	14	40						31,5	32	100			96	90	72	

SAFETY VALVE



with an adapter

CONSTRUCTIONAL EXECUTION

Full-lift, gasproof, spring, angled, flanged/threaded.

APPLICATION

For the securing the pressure vessels, boilers and other pressure devices against an unallowable rise of the working overpressure, for non-aggressive gases and vapours.

Application:

- pressure devices in the industry
- power engineering

TYPY / DN / PN / TEPLoty

P52 217 040	DN25	PN40	-196 to 300 °C	with adapter
P52 287 040	DN25	PN40	-196 to 300 °C	with adapter
P52 217 525	DN200	PN25	-60 to 400 °C	with adapter
P52 217 540	DN25÷150	PN40	-60 to 400 °C	with adapter
P52 217 5100	DN25÷100	PN100	-60 to 400 °C	with adapter
P52 217 525	DN200	PN25	-10 to 400 °C	with adapter
P52 217 540	DN25÷150	PN40	-10 to 400 °C	with adapter
P52 217 5100	DN25÷100	PN100	-10 to 400 °C	with adapter
P52 217 525	DN200	PN25	-10 to 200 °C	without ad.
P52 217 540	DN25÷150	PN40	-10 to 200 °C	without ad.
P52 217 5100	DN25÷100	PN100	-10 to 200 °C	without ad.

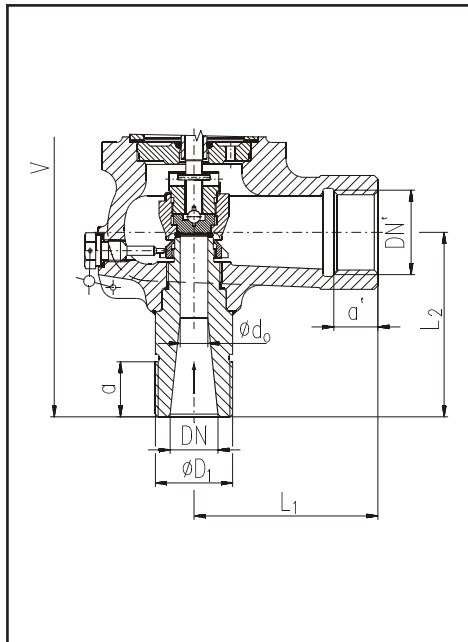
ADMISSIBLE PRESSURES AND TEMPERATURES

Standard	Types	PN	Temperature [°C]						
			-196	-60	-10	100	200	300	400
			Maximum working overpressure [bar]						
ČSN	P52 217 040	40	40	40	40	40	35,8	31,3	-----
	P52 287 040	40	40	40	40	40	35,8	31,3	-----
	P52 217 525	25	-----	25	25	25	22,3	19,5	18
	P52 217 540	40	-----	40	40	40	35,8	31,3	28,8
	P52 217 5100	100	-----	100	100	100	89,5	78,2	72,1
DIN	P52 217 525	25	-----	-----	25	25	22	17	13
	P52 217 540	40	-----	-----	40	40	35	28	21
	P52 217 5100	100	-----	-----	100	100	80	60	50

DIMENSION TABLE

Type designation		P52 217														
PN inlet / PN' outlet		25/10		40/16						100/25						
DN inlet / DN' outlet		200/300	25/40	40/65	50/80	65/100	80/125	100/150	125/200	150/250	25/40	40/65	50/80	65/100	80/125	100/150
φ d ₀ [mm]		120	15	25	32	40	50	60	80	100	15	25	32	40	50	60
L ₁ [mm]		330	100	120	125	145	170	210	250	290	110	130	150	155	205	210
L ₂ [mm]		290	105	130	145	150	180	200	230	270	120	140	150	165	185	200
V [mm]		1370	440	660	670	720	870	1000	1140	1340	440	660	700	850	960	1090
V _{adapter} [mm]		1410	480	710	720	770	940	1070	1210	1410	480	710	750	920	1030	1160
m [kg]		305	17	32	38	54	80	117	180	280	18	34	53	68	106	140
m _{adapter} [kg]		320	19	34	40	58	87	127	200	295	20	36	57	75	116	155
max. α _w [-]	Execution .10, .11	0,78														
	Execution .20, .21	0,67	0,51	0,67						0,51	0,67					
Opening pressure	p _{omin} [bar]	0,5														
	p _{omax} [bar]	14	40						23	30,5	100	98,2	96	90	72	

SAFETY VALVE



P52 287 040

FUNCTION

It is the full-lifted safety valve, full-lift, with functional properties according to the AD Merkblatt A2 and the ČSN 13 4309. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure. If the safety valve opens to the counterpressure then this can be max. 25% of the opening pressure, at the execution from -60 °C it is necessary to discuss it with the producer. From the point of view of the function there are these executions of the safety valves:

Execution .10 , .11 - the safety valve, full-lift, with a full lift

Execution .20 , .21 - the safety valve, full-lift with a limited lift

DIMENSION TABLE

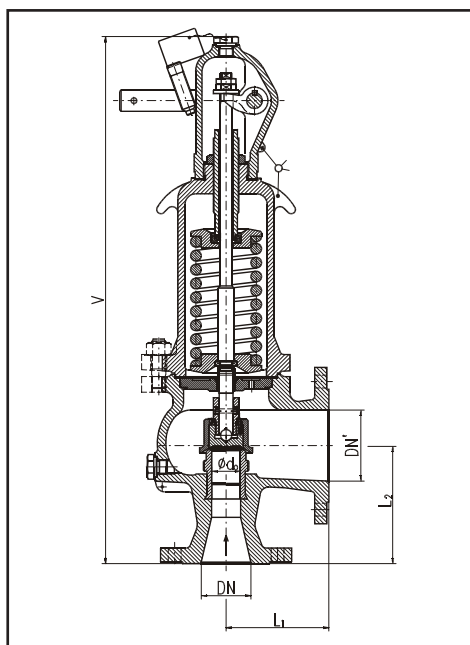
Type designation		P52 287 040
PN inlet / PN' outlet		40/16
DN inlet / DN' outlet		25/G11/2"
ϕd_0 [mm]		15
L_1 [mm]		100
L_2 [mm]		100
ϕD_1 [mm]		M42x2
a [mm]		34
a' [mm]		30
V [mm]		430
m [kg]		14
max. α_w [-]	Execution .10, .11	0,78
	Execution .20, .21	0,51
Opening pressure	p_{omin} [bar]	0,5
	p_{omax} [bar]	40

MATERIAL AND CONNECTION

	P52 217 040, P52 287 040 -196 °C to 300 °C	P52 217 525, 540, 5100 -60 °C to 400 °C	P52 217 525, 540, 5100 -10 °C to 400 °C	P52 217 525, 540, 5100 -10 °C to 200 °C
Body	17 248.4 ČSN 42 2931.4	17 248.4 ČSN 42 2714.9	1.0619N	1.0619N
Cover	ČSN 42 2931.4	ČSN 42 2714.9		
Lid	1.0619N	ČSN 42 2643 (ČSN 42 2314)		
Cone	STAINLES STEEL			
Spring	STAINLES STEEL	SPRING STEEL		
Connection	ČSN 13 1160	ČSN 13 1160	DIN 2543, 2544, 2545, 2547	DIN 2543, 2544, 2545, 2547

Note: Dimensions of connecting flanges see pages 114 and 115.

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Standard, closed. spring, angled, flanged.

APPLICATION

For the securing pressure vessels and other pressure equipments against an unallowable rise of the working overpressure, for the fluids with the kinematic viscosity to $400 \text{ mm}^2\text{s}^{-1}$.

Application:

- pressure equipments in the industry
- energetics (power engineering)
- heating systems - water

TYPES / DN / PN / TEMPERATURES

P54 217 540 DN25÷100 PN40 -10 to 200 °C

REST

Guaranteed discharge coefficient:

α_v [-]	0,54
----------------	------

FUNCTION

It is the standard safety valve with functional properties according to the AD-Merkblatt A2 and the ČSN 13 4309. If the safety valve discharges to the counterpressure, it can be max. 25% of the opening pressure. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

PN	Temperature [°C]		
	-10	100	200
40	Maximum working overpressure [bar]		
40	40	40	35

MATERIAL AND CONNECTION

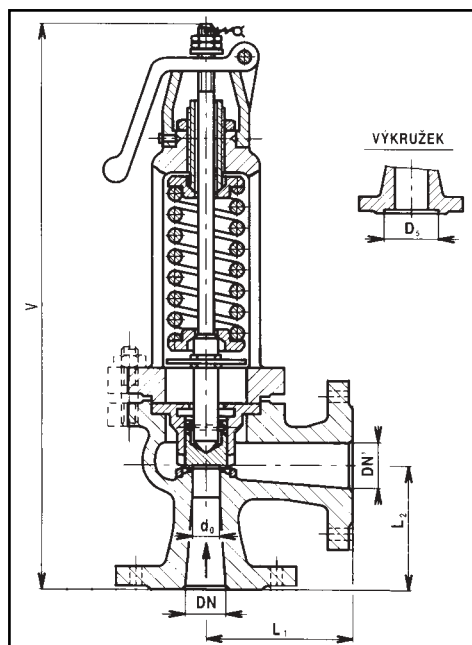
Body	1.0619N
Cover	
Lid	
Cone	STAINLESS STEEL
Spring	SPRING STEEL
Connection	INLET PN40 ACCORDING TO DIN2545 OUTLET PN16 ACCORDING TO DIN 2543

Note: The dimensions of connecting flanges see pages 114, 115.

DIMENSION TABLE

PN inlet / PN outlet	40 / 16					
DN inlet / DN outlet	25 / 40	40 / 65	50 / 80	65 / 100	80 / 125	100 / 150
ϕd_o [mm]	15	25	32	40	50	60
L_1 [mm]	100	120	125	145	170	210
L_2 [mm]	105	130	145	150	180	200
V [mm]	440	660	670	720	870	1000
m [kg]	17	32	38	54	80	117
p_{min} [bar]	0,5					
p_{max} [bar]	40					

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Full-lift, open, spring, angled, flanged.

APPLICATION

For the securing pressure vessels and other pressure equipments against an unallowable rise of the working overpressure for non-aggressive gases and vapours.
Application:

- pressure equipments in the industry
- energetics (power engineering)

TYPES / DN / PN / TEMPERATURES

P57 217 240	DN 25÷150	PN 40	-10 to 500 °C
P57 217 2100	DN 25÷80	PN 100	-10 to 500 °C
P57 217 540	DN 25÷150	PN 40	-50 to 400 °C
P57 217 5100	DN 25÷80	PN 100	-50 to 400 °C
P57 217 540	DN 25÷150	PN 40	-10 to 400 °C
P57 217 5100	DN 25÷80	PN 100	-10 to 400 °C

FUNCTION

It is the full-lifted safety valve, full-lift with functional properties according to the ČSN 13 4309. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure. This valve is not specified for the outlet to the counterpressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

Type	PN	Temperature [°C]							
		-50	-10	0	100	200	300	400	500
		Maximum working overpressure [bar]							
P57 217 240	40	-	40	40	40	40	40	40	31,1
P57 217 2100	100	-	100	100	100	100	100	100	77,7
P57 217 540	40	40	40	40	40	40	30,9	23,5	-
P57 217 5100	100	100	100	100	100	100	77,3	58,8	-

MATERIAL AND CONNECTION

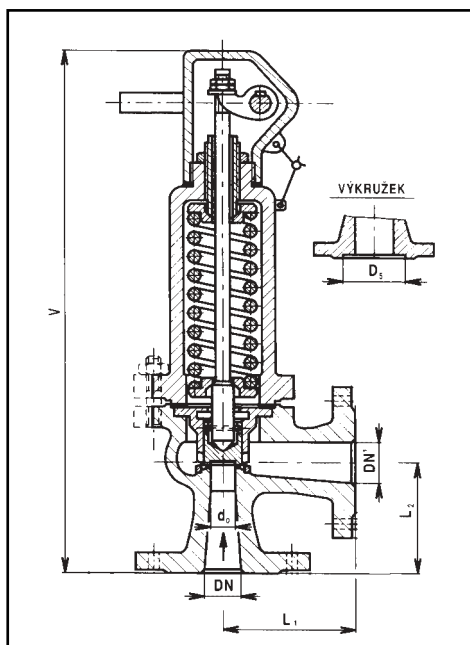
	P57 217 240, 2100 -10 °C to 500 °C	P57 217 540, 5100 -50 °C to 400 °C	P57 217 540,5100 -10 °C to 400 °C
Body	ČSN 42 2744.5	ČSN 42 2643.9	ČSN 42 2643.1
Cover	ČSN 42 2643.1	ČSN 42 2643.9	ČSN 42 2643.1
Lid	ČSN 42 2420		
Cone	STAINLESS STEEL		
Spring	SPRING STEEL		
Connection	ČSN 13 1160		

Note: The dimensions of connecting flanges see pages 114, 115.

DIMENSION TABLE

PN inlet / PN outlet		40 / 16								100 / 16				
DN inlet / DN outlet		25/40	40/65	50/80	65/100	80/125	100/150	125/200	150/250	25/40	40/65	50/80	65/100	80/125
∅ d ₀ [mm]		20	32	40	50	63	80	100	125	20	32	40	50	63
L ₁ [mm]		100	120	125	145	170	210	250	290	110	130	150	155	205
L ₂ [mm]		105	130	145	150	180	200	230	270	120	140	150	165	185
V [mm]		405	560	585	705	810	950	1100	1200	420	570	680	775	920
m [kg]		17	25	32	47	67	91	118	180	19	28	34	68	98
α _w [-]		0,714												
Opening pressure	p _{omin} [bar]	1												
	p _{omax} [bar]	40	40	40	37	38	40	31	18	78,5	78,5	75,5	61	62

SAFETY VALVE



CONSTRUCTIONAL EXECUTION

Full/lifted, gasproof, spring, angled, flanged.

APPLICATION

For the securing pressure vessels and other pressure equipments against an unallowable rise of the working erpressure for non-aggressive gases and steam and vapours and non/aggressive fluids.

Application:

- pressure equipments in the industry
- power engineering

TYPES / DN / PN / TEMPERATURES

P58 217 540	DN 25÷150	PN 40	-50 to 300°C
P58 217 5100	DN 25÷80	PN 100	-50 to 300°C
P58 217 540	DN 25÷150	PN 40	-10 to 300°C
P58 217 5100	DN 25÷80	PN 100	-10 to 400°C

FUNCTION

It is the safety valve, full-lift, with functional properties according to the ČSN 13 4309. If the safety valve blows off to the counterpressure, it can be max. 25% of the opening pressure. The pressure loss in the outlet pipeline can be max. 10% of the opening pressure.

ADMISSIBLE PRESSURES AND TEMPERATURES

Typy	PN	Temperature [°C]					
		-50	-10	0	100	200	300
		Maximum working overpressure [bar]					
P58 217 240	40	40	40	40	40	40	30,9
P58 217 2100	100	100	100	100	100	100	77,3

MATERIAL AND CONNECTION

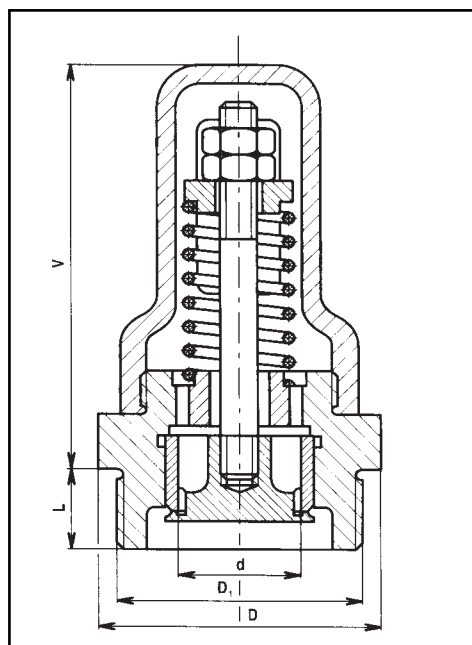
	P58 217 540, 5100 -50 °C to 300 °C	P58 217 540,5100 -10 °C to 300 °C
Body	ČSN 42 2643.9	ČSN 42 2643.1
Cover	ČSN 42 2643.9	ČSN 42 2643.1
Lid	ČSN 42 2420	
Cone	STAINLESS STEEL	
Spring	SPRING STEEL	
Connection	ČSN 13 1160	

Note: The dimensions of connecting flanges see pages 114, 115.

DIMENSION TABLE

PN inlet / PN outlet DN inlet / DN outlet	40 / 16								100 / 16					
	25/40	40/65	50/80	65/100	80/125	100/150	125/200	150/250	25/40	40/65	50/80	65/100	80/125	
∅ d ₀ [mm]	20	32	40	50	63	80	100	125	20	32	40	50	63	
L ₁ [mm]	100	120	125	145	170	210	250	290	110	130	150	155	205	
L ₂ [mm]	105	130	145	150	180	200	230	270	120	140	150	165	185	
V [mm]	400	555	585	700	810	970	1170	1260	415	565	680	775	940	
m [kg]	14	28	34	51	73	112	138	270	14,5	30	38	84	113	
Gases and vapours									0,714					
Liquids									0,05					
Opening pressure	p_{omin} [bar]	1								19,6				
	p_{omax} [bar]	40	40	40	37	38	40	31	18	78,5	78,5	75,5	61	62

AERATING SPRING LOADED VALVE



APPLICATION

The aerating spring loaded valve of a carbon steel is produced for PN 16. The aerating valve is used to the securing different equipments from a vacuum rise over a permissible value in the range of opening pressures 0,001, 0,097 MPa (abs.). In a dusty environment it is necessary the aerating valve to equip with a suitably arranged screen or filter so that there is intaken a clean air.

MATERIAL AND CONNECTION

P80 147 516	
Body	CARBON STEEL
Seat, cone	STAINLESS STEEL
Spring	SPECIAL SPRING STEEL
Connection	The connecting pin formed on the valve body has the external metric thread M 90x2

Note: The dimensions of connecting flanges see pages 114, 115.

DIMENSION TABLE

DN	50
D [mm]	100
L [mm]	30
V [mm]	150
D₁ [mm]	M 90x2
d [mm]	50
m [kg]	5
Guaranteed discharge coefficient for gases α_w [-]	0,01
Minimum flow area A_0 [mm²]	900