

Pressure vacuum relief valve, with deflagration and longburring proof flame arrester



LV

DIN PN 10 - 16 — DN 25 - 200mm
ANSI 125 - 150 — 2" - 8"

11, 11F, 12
12F, 17, 18

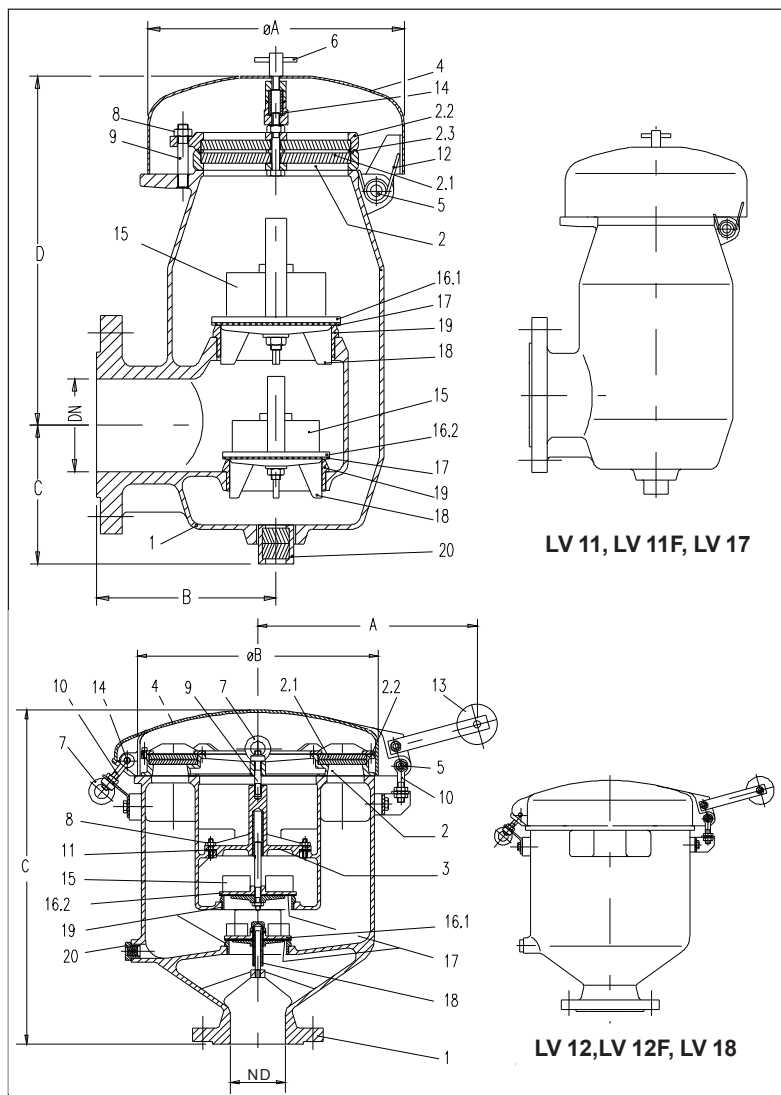
Application

Pressure and vacuum relief valves with flame arrester, LV series of Asca, are indicated for installation on vent pipes of storage tanks for flammable liquids and gases, for pressure and vacuum control and reduction of product losses due to evaporation. This equipment avoid the irruption of flames inside the reservoirs in case of fire and offers total protection against propagation of flames in case of external explosion and continuous combustion. Applicable to fluids of IIA group, according to DIN or Class D, according to NEC-USA standard.

Main Characteristics

- Absolute safety against irruption of flames inside the tanks in case of external explosion and continuous combustion;
- Equipped with a fuse element that, in case of inflammation, melts and loosens the articulated cover, alerting for applicable provisions;
- Perfect heat dissipation due to the location of the flame arrester element and the articulated cover, allowing burning during several hours, without flame irruption.

Ask for our sizing software



Materials and Connections

Modelo	LV 11F	LV 11	LV 17	LV 12F	LV 12	LV 18
ND mm	50	80	100	100	150	200
inch	2"	3"	4"	4"	6"	8"
Body	ASTM A 126 B Gray iron	ASTM A 395 Nodular iron	Aluminum	ASTM A 126 B Gray iron	ASTM A 395 nodular iron	Aluminum
Articulated cover	ASTM A 167 GR 304 (AISI 304) Stainless steel			Aluminum		
Flame arrester element	Stainless steel					
Frame	ASTM A 126 B Gray iron	ASTM A 395 nodular iron	Stainless steel	ASTM A 126 B Gray iron	ASTM A 395 nodular iron	Stainless steel
Valve seat	ASTM A 276 GR 304 (AISI 304) Stainless steel					
Switch	2.2 to 8 mbar		Aluminum			
	Over 8 mbar		Stainless steel			
Ballast	Lead					
Sealing	Teflon*					
Drain sleeve	AISI 304 stainless steel					
Connections	Flange according to DIN 2532 PN 10/16 or ANSI B 16.1 class 125 FF or B 16.5 class 150 RF					

Nº	Description	Quantity			
		LV 11 LV 11F LV 17	LV 12 LV 12F	LV 18	
1	Flame arrester element	1	1		
2.1*	Flame arrester element	2	2		
2.2	Frame (low. and up.)	2	2		
2.3	Spacing	1	1		
3	Guide cover		1		
4	Articulation cover	1	1		
5	Articulation pin	1	1		
6	Bolt	1			
7	Eyelet nut		2		
8	Nut	3	4		
9	Bolt	3	1		
10	Articulation bolt		2		
11*	Sealing ring		1		
12	Spring	1			
13	Counterweight		1		
14*	Fuse element	1	1		
15	Ballast	2	2		
16.1	Pressure switch	1	1		
16.2	Vacuum switch	1	1		
17	Sealing	2	2		
18	Guide	2	2		
19	Valve seat	2	2		
20*	Drain sleeve with flame arrester element	1	1		

*Material selection depending on the aggressiveness of the fluid. Other materials and connections according request.

*Recommended spare parts

- Low head loss in the flame arrester elements since the area is much larger than the passing area of the piping with the same Nominal Diameter;
- Rain and water splatter proof construction;
- flame arrester element sized according to the risk of each product (MESG) Maximum Experimental Safe Gap);
- Compact construction, including the flame arrester and pressure and vacuum relief valve in one unit.

Construction

The pressure and vacuum relief valves with flame arrester are provided with side connection (ND 2" – 4") and top connection (ND 4" – 8"). Consisting of the following main parts: body, flame arrester and articulated cover.

All the models are provided with a fuse element, which melts in the presence of a hot flame, allowing the opening of the cover, and a condensate drain.

The flame arrester consists of a double flame arrester element separated by a spacer and the frame. The flame arrester element channels are inclined in opposite directions.

The inclination direction is signaled with a "D" when to the right and a "E" when to the left, engraved on the band. The dimension of the flame arrester element channels is established according to the specific characteristics of the stored product.

The pressure relief and vacuum breaker valves are located below the arrester and at a distance long enough to avoid damages to the switches and sealing due to the heat of a continuous combustion over the flame arrester element.

Installation

The valves are supplied locked to avoid damages to the sealing during shipping. They shall be installed in the vertical position, at the ends of the vent pipes of the tanks. The locks shall be removed before installing the valve. Open the articulated cover to remove the locks. Remove the cover for the models LV 12, 12F and 18. the locks are placed on the pressure and vacuum switches and generally are cardboard.

When removing the locks perform a visual check of the switches and sealing and the flame arrester element surface.

Important

It is indispensable to guarantee that the only communication of the tank with the atmosphere is done only by way of the vent protected with the valve.

Measures & Weights

Model		LV 11	LV 11F	LV 17	LV 12	LV 12F	LV 18
ND	mm	50	80	100	100	150	200
	inch	2"	3"	4"	4"	6"	8"
Dimensions	mm						
	A	183	258	258	375	690	815
	B	150	130	190	530	460	550
	C	100	120	120	400	620	770
	D	253	278	307	-	-	-
Approx. Weight	kg						
Aluminum		10	20	23	32	73	118
Nodular iron		18	30	36	51	115	189

Opening Pressure

Model			Standard	Special
LV 11, 11F, 17 50 a 100 mm - (2" a 4")	Pressure		2.2 to 65 mbar	Up to 220 mbar
	Vacuum		- 2.2 to - 50 mbar	Up to -65 mbar
LV 12, 12F, 18 100 a 200 mm - (4" a 8")	Pressure		2.2 to 25 mbar	—
	Vacuum		- 2.2 to - 35 mbar	—

Caution

The non removal of the locks may lead to the destruction of the tank where the valve is installed.

Please see the "Installation and Maintenance Instructions" IM 12.21.10-I for more details.

Operation

The valve switches are calibrated with ballast, according to the determined opening pressure or vacuum and according to the allowable pressure of the tank (see Technical Information 1201).

From the initial pre-established opening pressure or vacuum, the valves open proportionally to the pressure or vacuum increase until total opening, maintaining thus the pressure and vacuum of the tank within the allowable limits.

If there is a sudden inflammation of the flowing gases (external explosion), the arrester absorbs energy (heat exchange), hindering the propagation of flames inside the tank

In case of continuous combustion (that may happen also due to an external explosion), the heat melts the fuse element and the articulated cover opens automatically, tensioned by the spring or the counterweight. Thus, the surface of the flame arrester is uncovered, allowing maximum heat dissipation during several hours, without risk of flame propagation and with time for the necessary provisions. Simultaneously, the open

cover signals, even at a distance, the occurrence of an irregularity in the installation.

The natural cooling through the spaces around the channels and the central opening of the annular flame arrester element hinder excessive heating of the body.

To avoid the penetration of the condensed water of the valve into the tank, there is a drain hole on the bottom. This hole is also protected with a flame arrester element against explosion.

The LV series valves, are the only one manufactures in Brazil complying with the strictest official requirements of protection against continuous combustion, including the DIN standard.

Flow Diagram

The maximum flow in m³/min and the maximum allowable pressure and vacuum of the tank in mbar, as well as the initial opening pressure and vacuum, shall be obtained to determine the Nominal Diameter of the valve. The maximum flow is selected as the largest value among the aspiration (vacuum relief) and emission (pressure relief).

The calculation of this flow shall consider not only the pump flow, but specially, the thermal flow (see Technical Information 1201).

The diagram shows the flow as a function of the differential pressure/vacuum between the initial pressure/vacuum and the maximum allowable pressure/vacuum of the tank.

Maximum allowable pressure/vacuum of the tank minus opening pressure/vacuum = overpressure (SP).

Select the Nominal Diameter immediately above the intersection point, between the horizontal flow line and the vertical overpressure line.

If the calculated flow is larger than the curve corresponding to the larger diameter (ND 200 mm – 8"), it is no longer possible to guarantee perfect heat dissipation in case of continuous combustion, as required by the DIN standards, even for annular flame arrester elements. To avoid this problem, use more than one valve per tank.

The diagram is valid for fluids with density = 1.3 kg/m³.

For the conversion use the formula:

$$Q_1 = Q \sqrt{\frac{y}{y_1}}$$

Q = equivalent flow in m³/min with 1.3 kg/m³ density

y = 1.3 kg/m³

Q₁ = real flow in m³/min

y₁ = real density in kg/m³

Also, the diagram includes the head loss of the pipe of attachment of the valve over the tank.

Example

Maximum aspiration flow: V_v = 9.0 m³/min

Maximum emission flow: V_p = 2.44 m³/min

Maximum allowable pressure in the tank:

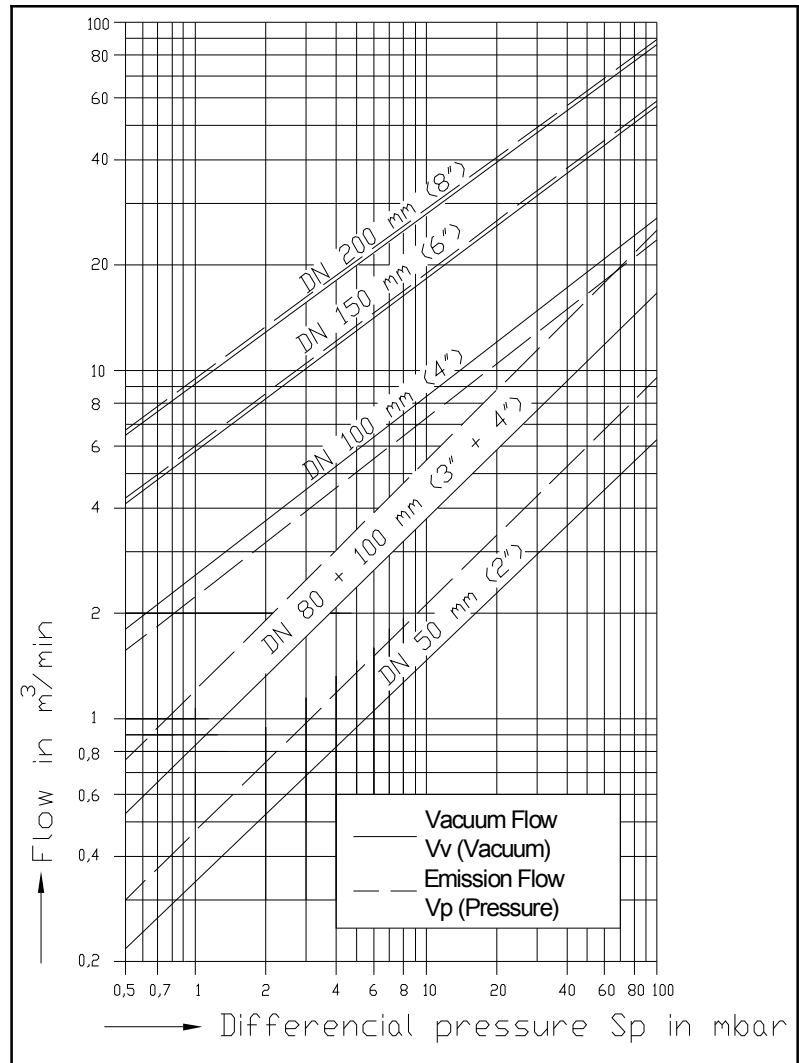
6 mbar

Maximum allowable vacuum in the tank:

6 mbar

Case 1

A 40% increase is forecasted between the initial opening pressure and the maximum allowable pressure in the tank.



$$\frac{6 \text{ mbar}}{1.4} = 4.3 \text{ mbar}$$

6 mbar / 1.4 = 4.3 mbar

6 mbar – 4.3 mbar = 1.7 mbar (Sp)

Selected from the diagram:

Flow: 9 m³/min

Overpressure: 1.7 mbar

Nominal Diameter: 200 mm (8")

Case 2

A 100% increase is forecasted between the initial opening pressure and the maximum allowable pressure in the tank (overpressure).

6 mbar – 3 mbar = 3 mbar (Sp)

Selected from the diagram:

Flow: 9 m³/min

Overpressure: 3 mbar

Nominal Diameter: 150 mm (6")

Sizing Data

ASCA will gladly provide the sizing calculation. For this, please provide:

- Nominal diameter of the tank (m)
- Cylindrical height of the tank (m)
- Maximum allowable vacuum and pressure in the tank (mbar)
- Initial opening pressure and vacuum (mbar)
- Flow of loading and unloading pumps (m³/h)
- Desired connection standard
- ND of the existing vent pipes in case of tanks already in operation
- Stored product

Standard Specification

Pressure and vacuum relief valve, with flame arrester, external explosion and continuous combustion proof.

Model LV..... of ASCA

According to catalog: PR-12.21.11-I

Data sheet

Flanged connection

According to standard

Nominal Diameter

ASCA EQUIPAMENTOS INDUSTRIAIS LTDA.

R. Fernandes da Cunha, 202- Vigário Geral - Rio de Janeiro - RJ - Brazil

CEP 21241-300 - Tel.: (21) 2472-6900 - Fax (21) 3014-7622

e-mail: office@asca.com.br - homepage: http://www.asca.com.br

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Ask for certified print for exact dimensions