

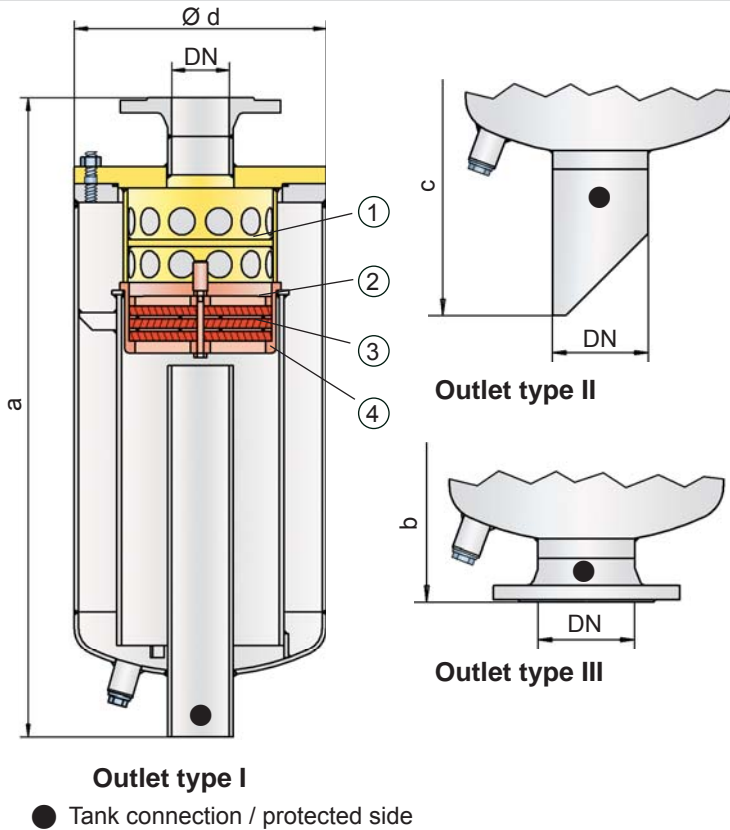


Liquid Detonation Flame Arrester

for filling and drain lines - internal installation



PROTEGO® LDA-F



conditions of use. The device is installed inside the container at the end of the line and prevents the combustion from being transferred into the tank if the explosive atmosphere ignites. The PROTEGO® LDA-F series of liquid detonation arresters combines the classic PROTEGO® flame arrester design with the siphon principle in which the liquid product serves as a barrier to flame propagation.

When a highly accelerated pipe deflagration or detonation occurs, the combustion pressure and flame propagation speed is first substantially reduced by the design and converted into a low-energy deflagration that is then stopped by the remaining immersion liquid and the PROTEGO® flame arrester.

The application limits for the device is product vapour/air mixture temperatures up to +60°C / 140°F and an absolute pressure up to 1.1 bar / 15.9 psi. This covers all of the possible operating conditions of empty lines for flammable liquids. The liquid detonation arrester in standard design is pressure-resistant up to 10 bar / 145 psi. The device protects against nearly all flammable liquids and is approved for explosion groups IIA to IIB3 (NEC group D and C MESH ≥ 0.65 mm).

Type-approved in accordance with the current ATEX Directive and EN ISO 16852 as well as other international standards.

Special Features and Advantages

- siphon protection offers a high degree of safety
- minimum risk of soiling
- low pressure loss
- provides protection from deflagrations and stable detonations
- useful for nearly all flammable liquids
- meets TRbF* requirements
- deliverable with different outlets

*TRbF = technical regulations for flammable liquids

Function and Description

The PROTEGO® LDA-F series of liquid detonation arresters was developed for storage tanks filling and drain lines that are not continuously filled with product and sometimes contain a combustible mixture. The integrated siphon protection (1) with PROTEGO® flame arrester unit (2) additionally prevents the liquid in which the lines are immersed from being siphoned off while the container is being drained. The PROTEGO® flame arrester consists of several FLAMEFILTER® discs (3) and spacers firmly held in a FLAMEFILTER® cage (4). The number of FLAMEFILTER® discs and their gap size depends on the arresters

Table 1: Dimensions

Dimensions in mm / inches

To select the nominal size (DN), please use the flow capacity chart on the following pages

DN	25 1"	32 1 ¼"	40 1 ½"	50 2"	65 2 ½"	80 3"	100 4"	125 5"	150 6"	200 8"	250 10"
a	550 / 21.65	550 / 21.65	650 / 25.59	650 / 25.59	850 / 33.46	875 / 34.45	1050 / 41.34	1250 / 49.21	1450 / 57.09	1600 / 62.99	1975 / 77.76
b	588 / 23.15	590 / 23.23	692 / 27.24	695 / 27.36	895 / 35.24	925 / 36.42	1102 / 43.39	1305 / 51.38	1505 / 59.25	1662 / 65.43	2043 / 80.43
c	775 / 30.51	775 / 30.51	875 / 34.45	875 / 34.45	1075 / 42.32	1095 / 43.11	1270 / 50.00	1480 / 58.27	1680 / 66.14	1830 / 72.05	2275 / 89.57
d	140 / 5.51	140 / 5.51	220 / 8.66	220 / 8.66	275 / 10.83	275 / 10.83	356 / 14.07	457 / 17.99	508 / 20.00	600 / 23.62	711 / 27.99

Table 2: Selection of the explosion group

MESH	Expl. Gr. (IEC/CEN)	Gas Group (NEC)	
> 0,90 mm	IIA	D	Special approvals upon request
$\geq 0,65$ mm	IIB3	C	



Stabilized FLAMEFILTER®
Discs (Flyer pdf)

Table 3: Specification of max. operating temperature

≤ 60°C / 140°F	Tmaximum allowable operating temperature in °C	higher operating temperatures upon request
-	Designation	

Table 4: Material selection for housing

Design	A	B	Special materials upon request
Housing	Steel	Stainless Steel	
Shock absorber	Steel	Stainless Steel	
Gasket	FPM	PTFE	
Flame arrester unit	A	A	

Table 5: Material for flame arrester unit

Design	A	* the FLAMEFILTER® are also available in the materials Tantalum, Inconel, Copper, etc. when the listed housing and cage materials are used.
FLAMEFILTER® cage	Stainless Steel	
FLAMEFILTER® *	Stainless Steel	
Spacer	Stainless Steel	Special materials upon request

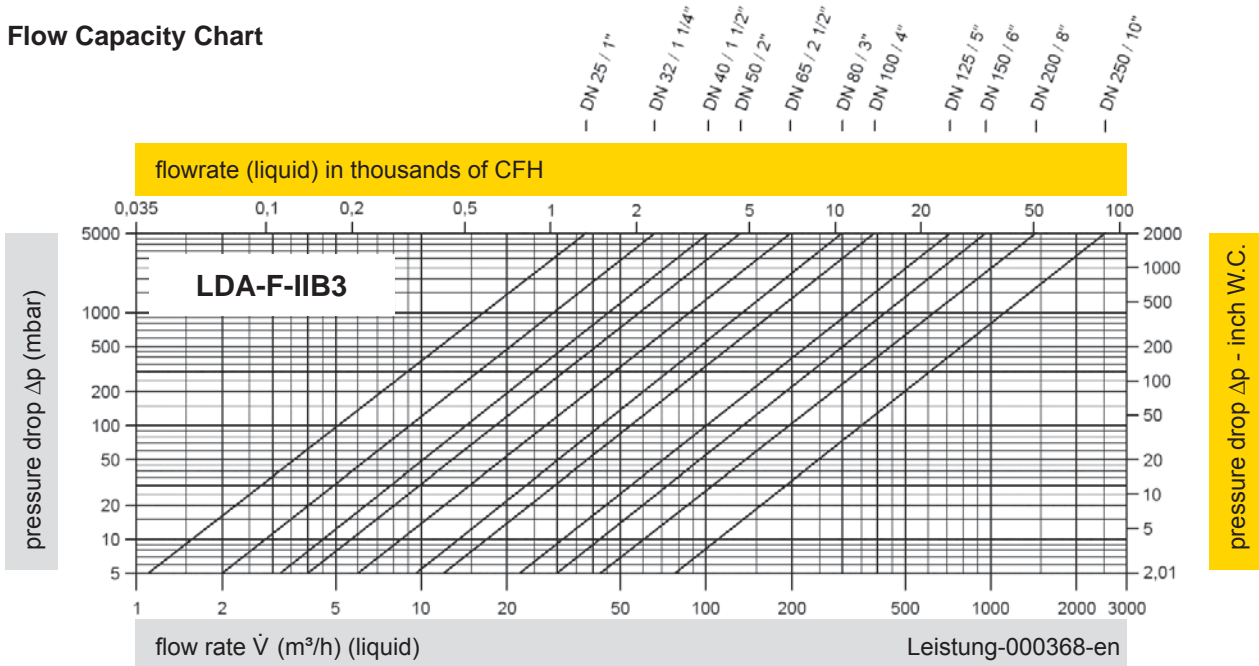
Table 6: Flange connection type

EN 1092-1; Form B1	other types upon request
ASME B16.5; 150 lbs RFSF	

Table 7: Outlet type

Straight pipe	I	other types upon request
Beveled pipe	II	
EN 1092-1; Form B1	III	
ASME B16.5; 150 lbs RFSF	III	

Flow Capacity Chart



$$\text{Conversion: } \dot{V}_{\text{liquid}} = \dot{V}_{\text{water}} * \sqrt{\frac{\rho_{\text{water}}}{\rho_{\text{liquid}}}}$$

The volume flow \dot{V} in m³/h was determined with water according to DIN EN 60534 at a temperature $T_n = 15^\circ\text{C}$ and an atmospheric pressure $p_n = 1,013 \text{ bar}$, kinematic viscosity $\nu = 10^{-6} \text{ m}^2/\text{s}$. To avoid electrostatic charge of flammable liquids the maximum flow is limited (refer to BG-Regulation 132, CENELEC-Report CLC/TR 50404).

