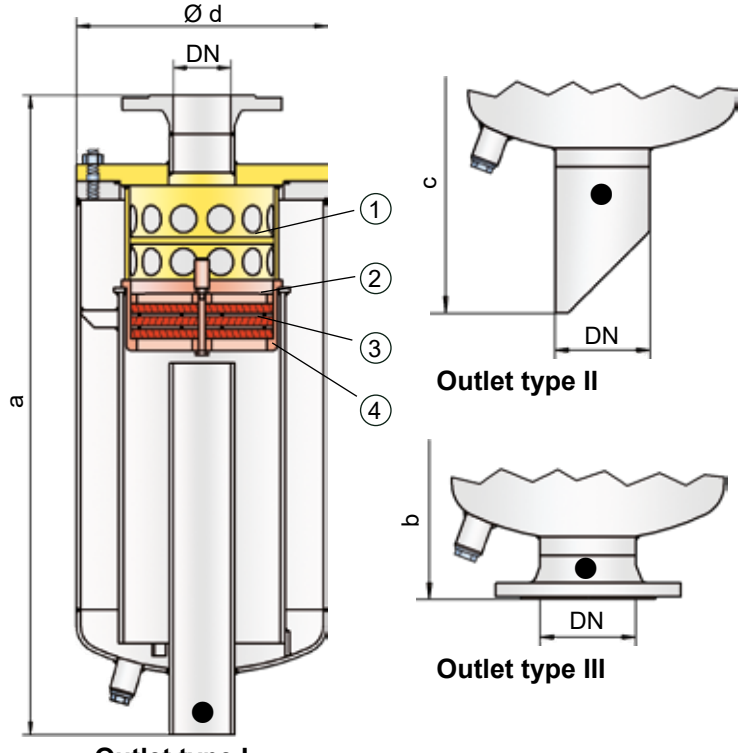
Liquid Detonation Flame Arrester

for filling and drain lines - internal installation

PROTEGO® LDA-F



Outlet type I

Outlet type II

Outlet type III

● Tank connection / protected side

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 combine 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 are substantially reduced by the design, converted into a low-energy deflagration, and then stopped by the remaining immersion liquid and the PROTEGO® flame arrester.

The application limits for the device is product vapor/air mixture temperatures up to +60°C / 140°F and an absolute pressure up to 1.1 bar / 15.9 psi. This covers all 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 MESG ≥ 0.65 mm). EU conformity according to the currently valid ATEX directive. Approvals according to other national/international regulations on request.

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 unit 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 arrester's intended use.

Special Features and Advantages

- siphon protection offers increased safety
- low risk of contamination
- low pressure loss
- provides protection against deflagrations and stable detonations
- useable for nearly all flammable liquids
- meets TRGS* requirements
- available with different connections

* TRGS = technical regulations for hazardous substances

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

MESG	Expl. Gr. (IEC/CEN)	Gas Group (NEC)	
≥ 0,65 mm	IIB3	C	Special approvals upon request.

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.
-	Classification	

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

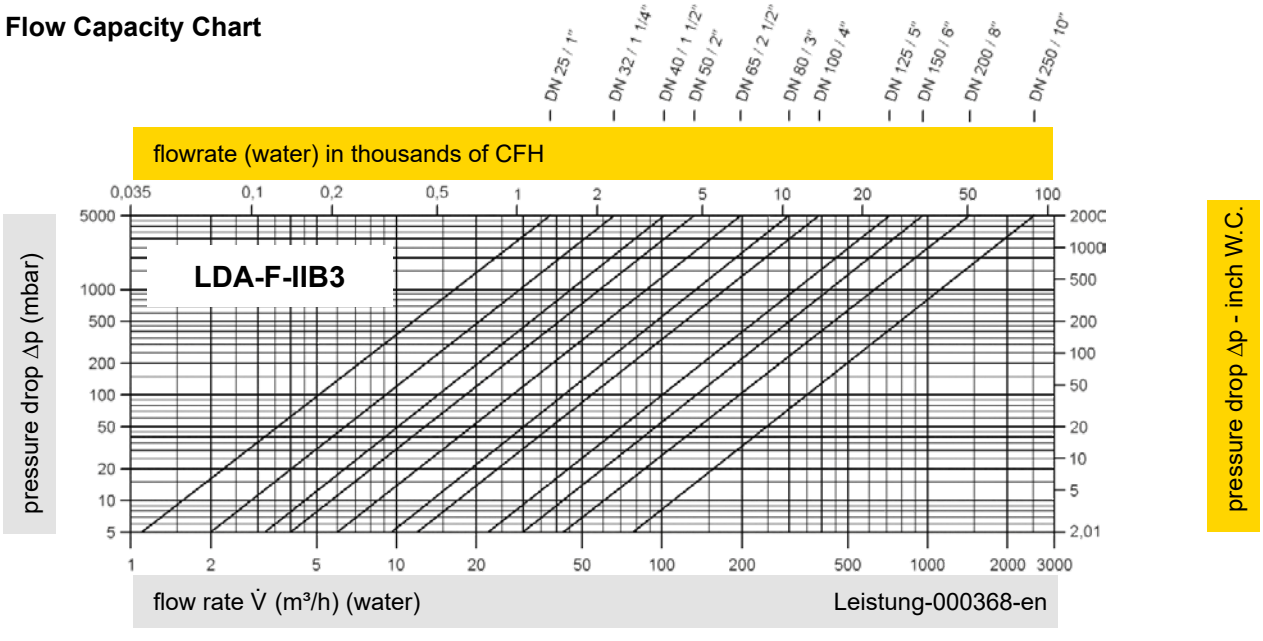
Table 6: Flange connection type

EN 1092-1; Form B1	Other types upon request.
ASME B16.5 CL 150 R.F.	

Table 7: Outlet type

Straight pipe	I	Other types upon request.
Beveled pipe	II	
EN 1092-1; Form B1	III	
ASME B16.5 CL 150 R.F.	III	

Flow Capacity Chart



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

The volume flow V̇ in m³/h was determined with water, in accordance with DIN EN 60534, at a temperature T_n = 20°C and an atmospheric pressure p_n = 1,013 bar, kinematic viscosity v = 10^{-6} m²/s.
To avoid electrostatic charge of flammable liquids, the maximum flow is limited (refer to TRGS 727, CENELEC-Report CLC/TR 60079-32-1).

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