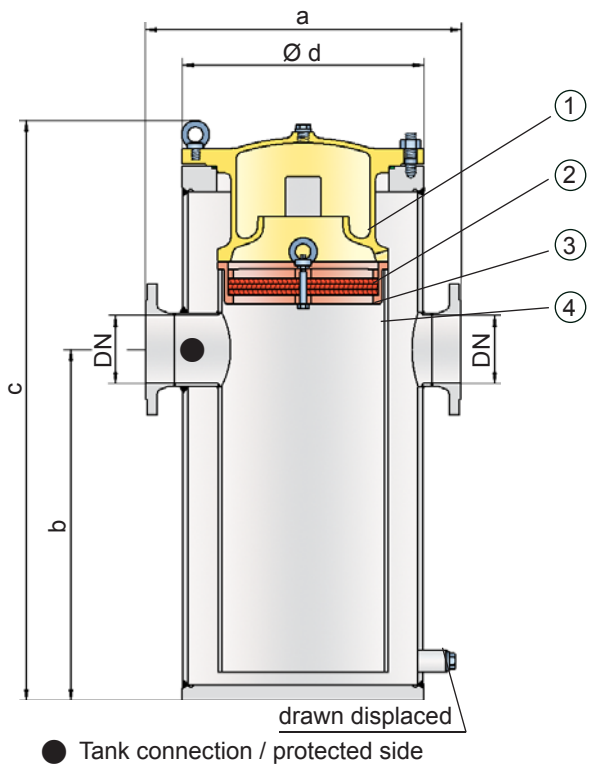
# In-Line Liquid Detonation Flame Arrester

**for filling and drain lines - external installation**

## PROTEGO® LDA-WF(W)




● Tank connection / protected side

### Function and Description

The PROTEGO® LDA-WF(W) series of liquid detonation flame arresters was developed for storage container filling 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. 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 conditions of use. The device is installed outside of the container in the filling and drain lines. If the explosive atmosphere is ignited, the device prevents the combustion from traveling into the tank. The PROTEGO® LDA-WF(W) series of liquid detonation flame 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 range for the device is a product vapour/air mixture temperature 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 is designed for pressures up to 10 bar / 145 psi and therefore resists explosion pressure and offers protection for almost all flammable liquids. The device is approved for explosion groups IIA to IIB3 (NEC group D to C MESG ≥ 0.65 mm). Special designs with a cleaning cover for highly viscous liquids can be provided.

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

### Special Features and Advantages

- the device is easily accessible since it is mounted on the containers outside
- 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

*TRbF = technical regulations for flammable liquids

**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<br>1" | 32<br>1 ¼" | 40<br>1 ½" | 50<br>2" | 65<br>2 ½" | 80<br>3" | 100<br>4" | 125<br>5" | 150<br>6" | 200<br>8" | 250<br>10" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| a | 250 /<br>9.84 | 250 /<br>9.84 | 346 /<br>13.62 | 350 /<br>13.78 | 446 /<br>17.56 | 450 /<br>17.72 | 500 /<br>19.69 | 600 /<br>23.62 | 600 /<br>23.62 | 700 /<br>27.56 | 900 /<br>35.43 |
| b | 325 /<br>12.80 | 325 /<br>12.80 | 415 /<br>16.34 | 415 /<br>16.34 | 535 /<br>21.06 | 535 /<br>21.06 | 600 /<br>23.62 | 915 /<br>36.02 | 915 /<br>36.02 | 1090 /<br>42.91 | 1300 /<br>51.18 |
| c | 475 /<br>18.70 | 475 /<br>18.70 | 605 /<br>23.82 | 605 /<br>23.82 | 831 /<br>32.72 | 831 /<br>32.72 | 936 /<br>36.58 | 1340 /<br>52.76 | 1340 /<br>52.76 | 1520 /<br>59.84 | 1750 /<br>68.90 |
| d | 150 /<br>5.91 | 150 /<br>5.91 | 210 /<br>8.27 | 210 /<br>8.27 | 275 /<br>10.83 | 275 /<br>10.83 | 325 /<br>12.80 | 460 /<br>18.11 | 460 /<br>18.11 | 510 /<br>20.08 | 610 /<br>24.02 |

**Table 2: Selection of the explosion group**

| MESG | Expl. Gr. (IEC/CEN) | Gas Group (NEC) | |
|---|---|---|---|
| > 0,90 mm | IIA | D | Special approvals upon request |
| ≥ 0,65 mm | IIB3 | C | |

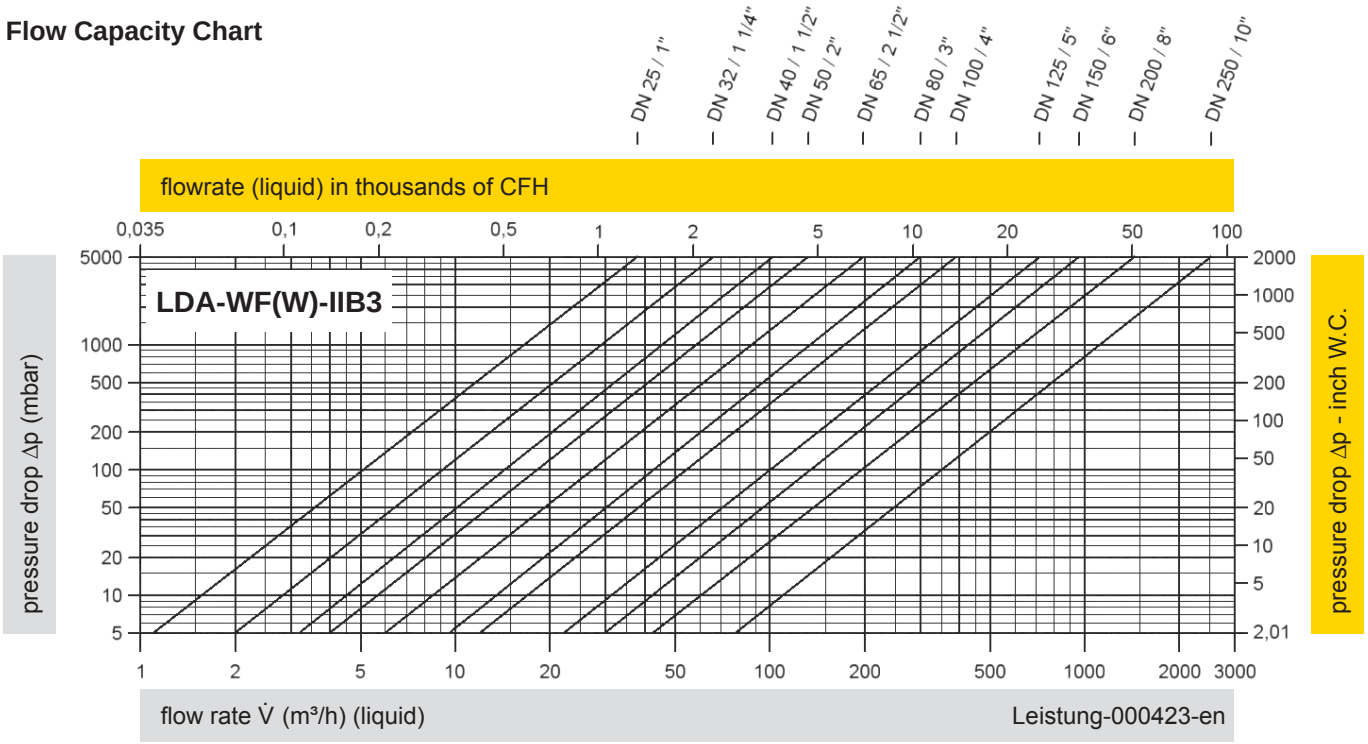
| Table 3: Specification of max. operating temperature | | |
|---|---|---|
| ≤ 60°C / 140°F | Tmaximum allowable operating temperature in °C | higher operating temperatures upon request |
| - | Designation | |

| Table 4: Material selection for housing | | | |
|---|---|---|---|
| Design | A | B | Special materials upon request |
| Housing | Steel | Stainless Steel | |
| Shock absorber | Steel | Stainless Steel | |
| Gasket (shock absorber) | FPM | PTFE | |
| Gasket (locking screw) | PTFE | 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.<br>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; 150 lbs RFSF | |

## Flow Capacity Chart




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

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

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