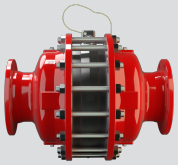
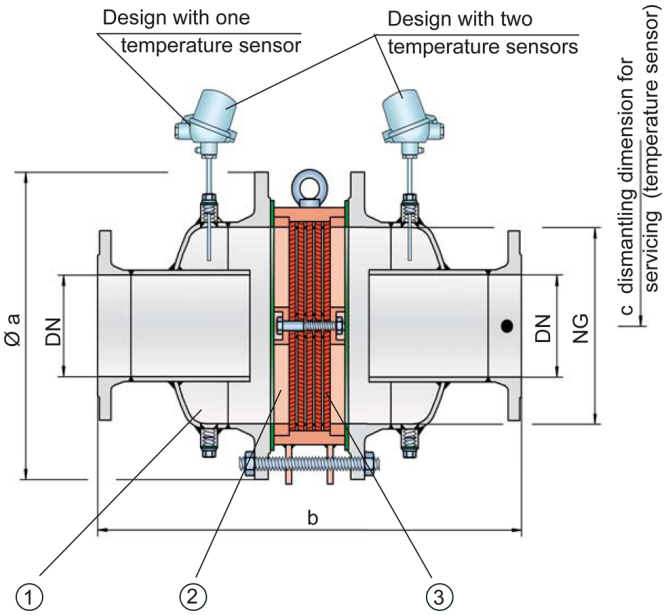


In-Line Detonation Flame Arrester

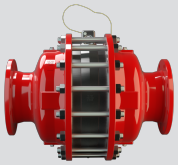
for stable detonations and deflagrations in a straight through design with shock tube, bidirectional

PROTEGO® DA-SB-EO-P1,1



Features and Advantages

- Worldwide first flame arresting unit for Ethylene oxide, which has been tested and approved with Ethylene oxide/Air-mixtures
- Provides protection from flame transmission with Ethylene oxide/Air-mixtures
- Optimized performance from the patented Shock Wave Guide Tube Effect (SWGTE)
- Less number of FLAMEFILTER® from the use of the patented shock tube
- The modular design enables individual FLAMEFILTER® to be replaced
- Minimum pressure loss and associated low operating and life-cycle costs
- Cost efficient spare parts
- Service-friendly design
- Bidirectional operation as well as any direction of flow and installation position



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Function and Description

The in-line detonation flame arresters type PROTEGO® DA-S-B-EO are the newest generation of flame arresters. Based on flow and explosion dynamic calculations as well as decades of field tests, a product line was developed that offers minimum pressure losses with maximum safety. The flame arrester uses the Shock Wave Guide Tube Effect (SWGTE) to separate the flame front and shock wave. The result is an in-line detonation arrester without a classic shock absorber, which minimizes the use of FLAMEFILTER® discs.

The devices are symmetrical and offer bi-directional flame arresting for deflagrations and stable detonations for Ethylene oxide/Air-mixtures. The arrester essentially consists of two housing parts with an integrated shock tube (1) and the PROTEGO®-flame arrester unit (2) in the center. The PROTEGO® flame arrester unit is modular and consists of several FLAMEFILTER® discs (3) and spacers firmly held in a FLAMEFILTER® casing.

The standard design can be used with an operating temperature of up to +60°C / 140°F and an absolute operating pressure up to 1.1 bar / 15.9 psi.

EU conformity according to the currently valid ATEX directive.

Design and Specifications

There are four different designs available:

Basic design of the detonation arrester	**DA-SB - – - EO**
In-line detonation flame arrester with integrated temperature sensor* as additional protection against short time burning of one side	**DA-SB- T - EO**
Detonation arrester with two integrated temperature sensors* as additional protection against short time burning from both sides	**DA-SB- TB - EO**
In-line detonation flame arrester with heating jacket	**DA-SB- H - EO**

Additional special arresters upon request

*Resistance thermometer for device group II, category (1) 2 (GII cat. (1) 2)

● Connection to the protected side (only for type DA-SB-T-...)

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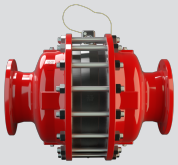

In-Line Detonation Flame Arrester

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PROTEGO® DA-SB-EO-P1,1

Table 1: Dimensions Dimensions in mm / inches

To select nominal width/nominal size (NG/DN) - combination, please use the flow capacity charts on the following pages

Standard					
NG	150 / 6“	150 / 6“	200 / 8“	300 / 12“	400 / 16“
DN	≤50 / 2"	65, 80 / 2½", 3"	≤100 / 4"	≤150 / 6"	≤200 / 8"
a	285 / 11.22	285 / 11.22	340 / 13.39	445 / 17.52	565 / 22.24
b	400 / 15.75	400 / 15.75	500 / 19.69	638 / 25.12	700 / 27.56
c	500 / 19.69	500 / 19.69	520 / 20.47	570 / 22.44	620 / 24.41

Table 2: Selection of explosion group

MESG	Expl. Gr. (IEC / CEN)	Gas Group (NEC)
≥ 0,59 mm	EO	EO

Special approvals upon request

Table 3: Selection of max. operating pressure

DN	≤50 / 2"	65, 80 / 2½", 3"	≤100 / 4"	≤150 / 6"	≤200 / 8"
NG	150 / 6"	150 / 6"	200 / 8"	300 / 12"	400 / 16"
Pmax	1,1 / 15.9	1,1 / 15.9	1,1 / 15.9	1,1 / 15.9	1,1 / 15.9

Pmax = maximum allowable operating pressure in bar / psi absolut

Table 4: Specification of max. operating temperature

≤ 60°C / 140°F	Tmaximum allowable operating temperature in °C

higher operating temperatures upon request

Table 5: Material selection for housing

Design	A	B	C
Housing	Steel	Stainless Steel	Hastelloy
Heating jacket (DA-SB-(T)-H-...EO)	Steel	Stainless Steel	Stainless Steel
Gasket	PTFE	PTFE	PTFE
Flame arrester unit	A, B	B, C, D	D

The housing is also available in carbon steel with an ECTFE coating.

Table 6: Material combinations of flame arrester unit

Design	A	B	C	D
FLAMEFILTER® cage	Steel	Stainless Steel	Stainless Steel	Hastelloy
FLAMEFILTER®*	Stainless Steel	Stainless Steel	Hastelloy	Hastelloy
Spacer	Stainless Steel	Stainless Steel	Hastelloy	Hastelloy

*the FLAMEFILTER® are also avail- able in the materials Tantalum, Inconel, Copper, etc. when the listed housing and cage materials are used.

Table 7: Flange connection type

EN 1092-1; Form B1
ASME B16.5 CL 150 R.F.

other connections upon request

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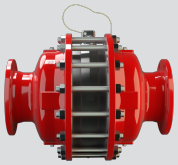

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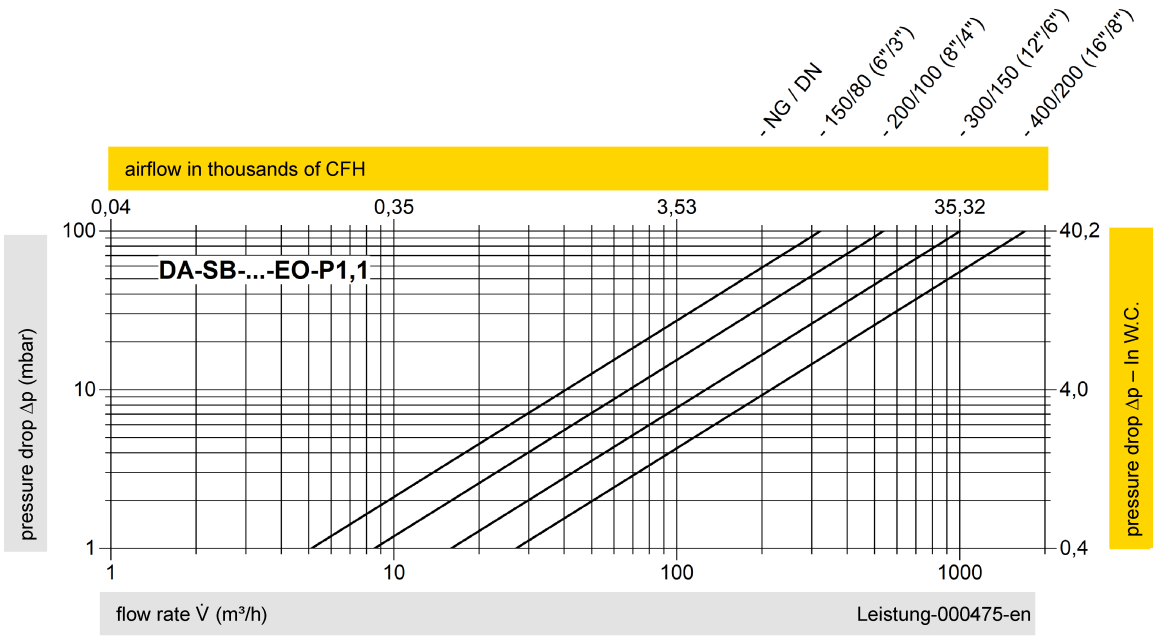
Flow Capacity Charts



The flow capacity charts have been determined with a calibrated and TÜV certified flow capacity test rig. Volume flow V in (m³/h) and CFH refer to the standard reference conditions of air ISO 6358 (20°C, 1bar). For conversion to other densities and temperatures refer to Sec. 1: “Technical Fundamentals”.

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