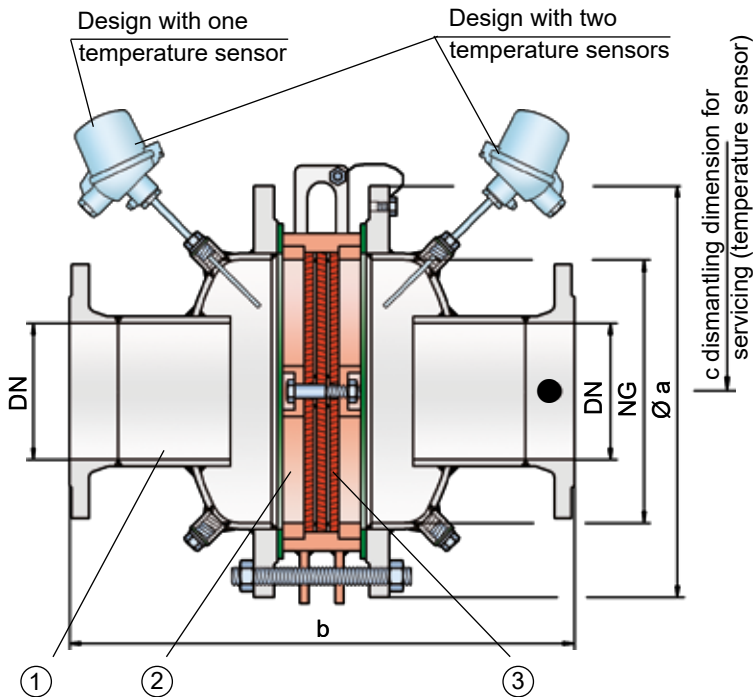


In-Line Deflagration Flame Arrester

concentric design,
bi-directional

PROTEGO® FA-I



● Connection to the protected side
(only for type FA-I-T-....)

Function and Description

In the development of the PROTEGO® FA-I in-line deflagration flame arrester, special effort was made to optimize the fluid dynamic flow characteristics. For a given flange connection size of the flame arrester, the FLAMEFILTER® size can be chosen for the most adequate flow capacity. When installing the deflagration flame arrester, make sure that the distance between potential ignition sources and location of the installed device does not exceed the L/D ratio (pipe length/pipe diameter) for which the device was tested (see table 4).

The deflagration flame arrester is symmetrical and offers bi-directional flame transmission protection. The device essentially consists of two housing parts (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 number of FLAMEFILTER® discs and their gap size depends on the arrester's intended use.

Specifying the operating conditions, such as the temperature, pressure, explosion group, and the composition of the fluid, enables PROTEGO® to select the best deflagration flame arrester for your application. The PROTEGO® FA-I series of deflagration flame arresters is available for substances of explosion groups IIA and IIB3 (NEC groups D and C ((MESG ≥ 0.65 mm)).

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. Devices with special approvals for higher pressures (see table 3) and higher temperatures are available upon request.

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

Special Features and Advantages

- optimized flow capacity
- different series allow increase of FLAMEFILTER® size for given flange connection resulting in lower pressure drop across the device
- option for integrated cleaning nozzles can be provided
- modular flame arrester unit enables each individual FLAMEFILTER® to be replaced and cleaned
- bi-directional flame transmission proof design
- protects with deflagrations for explosion groups IIA and IIB3 (NEC groups D and C)
- design available for elevated operating temperatures and pressures
- available sizes from DN 50 / 2" to DN 1000 / 40"
- lowest pressure drop results in low operating and lifecycle costs
- modular design reduces spare parts cost
- use of stabilized FLAMEFILTER® discs is possible
- use of PROTEGO® flame arrester unit in unique maintenance friendly design reduces service cost

Design and Specifications

There are three different designs:

Basic deflagration flame arrester design **FA-I-**

In-line deflagration flame arrester with integrated temperature sensor* for additional protection against short-time burning from one side **FA-I-**

In-line deflagration flame arrester with two integrated temperature sensors* for additional protection against short-time burning from both sides **FA-I-**

Additional special devices available upon request

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



Stabilized FLAMEFILTER®
Discs (Flyer pdf)



New PROTEGO® Flame Arrester Unit with
unique maintenance friendly design (Flyer pdf)

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.		Additional nominal width/nominal size (NG/DN) combinations with improved flow capacity upon request.											
standard													
NG	150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	800 32"	1000 40"	1200 48"	1400 56"	1600 64"	
DN	≤ 50 2"	80 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 400 16"	≤ 500 20"	≤ 600 24"	≤ 800 32"	≤ 800 32"	
a	285 / 11.22	285 / 11.22	340 / 13.39	445 / 17.52	565 / 22.24	670 / 26.38	780 / 30.71	975 / 38.39	1175 / 46.26	1405 / 55.31	1630 / 64.17	1830 / 72.05	
Expl. Gr.	IIA b*	364 / 14.33	364 / 14.33	452 / 17.79	584 / 22.99	638 / 25.12	688 / 27.09	800 / 31.50	900 / 35.43	1000 / 39.37	1100 / 43.31	1350 / 53.15	1450 / 57.09
	IIB3 b*	364 / 14.33	364 / 14.33	464 / 18.27	596 / 23.46	650 / 25.59	700 / 27.56	800 / 31.50	900 / 35.43	1000 / 39.37	1100 / 43.31	1350 / 53.15	1450 / 57.09
c	500 / 19.69	500 / 19.69	520 / 20.47	570 / 22.44	620 / 24.41	670 / 26.38	700 / 31.50	900 / 35.43	1000 / 39.37	1100 / 43.31	1350 / 53.15	1450 / 57.09	

*Dimension b only for P1.2 (IIA) and P1.1 (IIB3).

Table 2: Selection of the explosion group

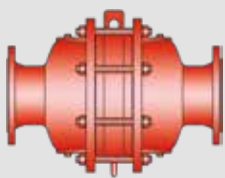
MESG	Expl. Gr. (IEC/CEN)	Gas Group (NEC)	Special approvals upon request.
> 0.90 mm	IIA	D	
≥ 0.65 mm	IIB3	C	

Table 3: Selection of max. operating pressure

NG	150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	800 32"	1000 40"	1200 48"	1400 56"	1600 64"	
DN	≤ 50 2"	80 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 400 16"	≤ 500 20"	≤ 600 24"	≤ 800 32"	≤ 800 32"	
Expl. Gr.	IIA	P _{max} 1.8 / 26.1	1.8 / 26.1	1.5 / 21.7	1.5 / 21.7	1.5 / 21.7	1.5 / 21.7	1.5 / 21.7	1.4 / 20.3	1.3 / 18.8	1.3 / 18.8	1.2 / 17.4	1.1 / 15.9
	IIB3	P _{max} 1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9

P_{max} = maximum allowable operating pressure in bar / psi absolut, higher operating pressure upon request.





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Table 4: Max. allowable L/D-ratio

standard												
NG	150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	800 32"	1000 40"	1200 48"	1400 56"	1600 64"
DN	≤ 50 2"	80 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 400 16"	≤ 500 20"	≤ 600 24"	≤ 800 32"	≤ 800 32"
(L/D) _{max}	50	50	50	50	50	50	50	50	50	50	50	50
IIA P _{max}	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.2 / 17.4	1.3 / 18.8	1.3 / 18.8	1.2 / 17.4	1.1 / 15.9
Classification	-	-	-	-	-	-	-	-	-	-	-	-
(L/D) _{max}	50	50	40	40	35	35	35	30	30	30	25	25
IIB3 P _{max} (bar /psi)	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9
Classification	-	-	X6	X6	X7	X7	X7	X8	X8	X8	X9	X9

Table 5: Specification of max. operating temperature

≤ 60°C / 140°F	T _{maximum allowable operating temperature in °C}	Higher operating temperatures upon request.
-	Classification	

Table 6: Material selection for housing

Design	A	B	C	
Housing	Steel	Stainless Steel	Hastelloy	The housing can also be delivered in carbon steel with an ECTFE coating.
Gasket	PTFE	PTFE	PTFE	
Flame arrester unit	A, B	C	D	

Special materials upon request.

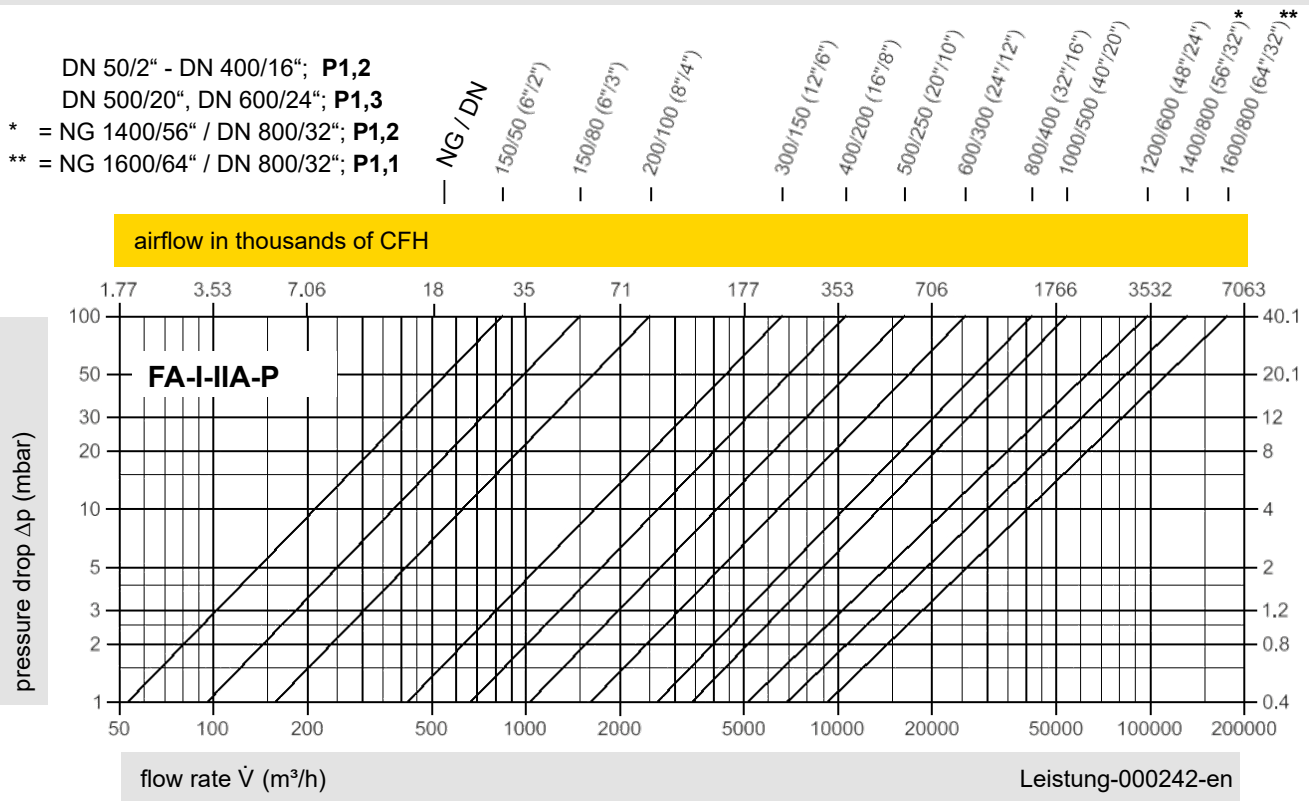
Table 7: Material combinations of the flame arrester unit

Design	A	C	D	
FLAMEFILTER® casing	Steel	Stainless Steel	Hastelloy	* the FLAMEFILTER® is also available in Tantalum, Inconel, Copper, etc., when the listed housing and casing materials are used.
FLAMEFILTER® *	Stainless Steel	Stainless Steel	Hastelloy	
Spacers	Stainless Steel	Stainless Steel	Hastelloy	

Special materials upon request.

Table 8: Flange connection type

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

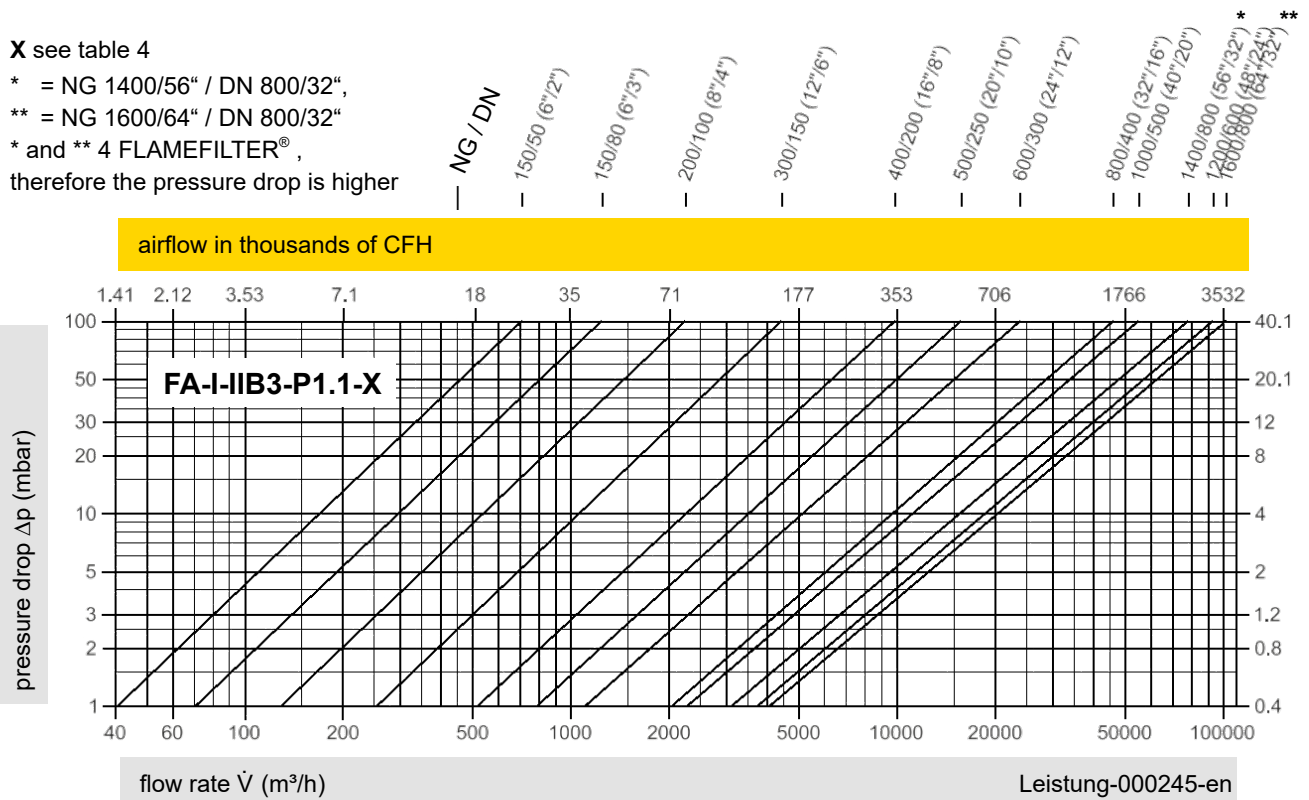


X see table 4

* = NG 1400/56" / DN 800/32",

** = NG 1600/64" / DN 800/32"

* and ** 4 FLAMEFILTER®,
 therefore the pressure drop is higher



The flow capacity charts have been determined with a calibrated and TÜV certified flow capacity test rig.

Volume flow \dot{V} in (m³/h) and CFH refer to the standard reference conditions of air in ISO 6358 (20°C, 1bar).

For conversion to other densities and temperatures, refer to Sec. 1: "Technical Fundamentals."



for safety and environment