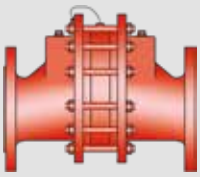
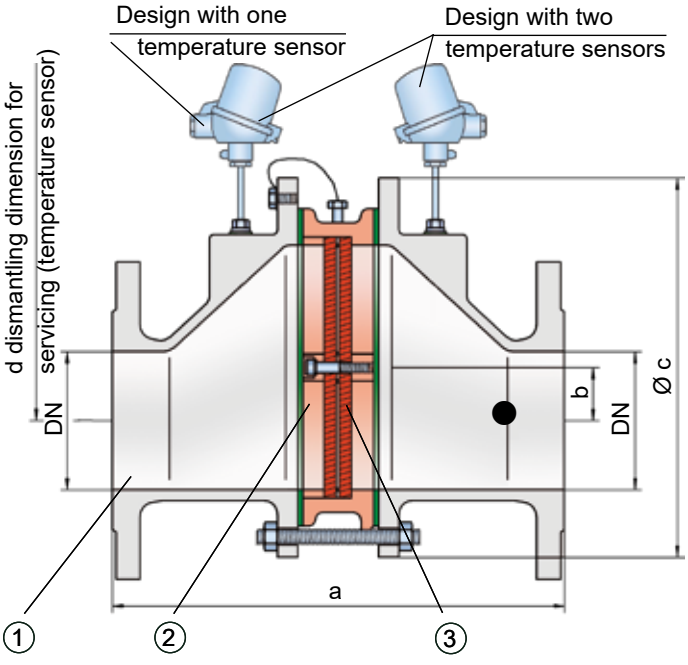


In-Line Deflagration Flame Arrester

for biogas, sewage gas and landfill gas, eccentric design, bidirectional, endurance burning-proof (under atmospheric conditions up to DN 200 / 8“)

PROTEGO® FA-E-IIA1



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

Function and Description

The PROTEGO® FA-E-IIA1 series of in-line deflagration flame arresters is designed with an eccentric housing to automatically drain condensate build up in the housing. The PROTEGO® FA-E-IIA1 in-line flame arrester was specially developed for bio-, sewage- and landfill-gas applications. The application as an endurance burning proof in-line device under atmospheric conditions without extensive temperature monitoring is of advantage. Due to its eccentric design and in contrast to conventional concentric flame arresters the device can be installed in pipelines that run close to floors or walls. When installing the deflagration flame arrester make sure that the distance between potential ignition sources and the location of the installed device does not exceed the L/D ratio (pipe length/ pipe diameter) for which the device was approved. According to EN ISO 16852 the installation limits are $(L/D)_{max} \leq 50$ for deflagration flame arresters for explosion group IIA1- methane (former designation Expl.gr. I).

The deflagration flame arrester is symmetric and offers bidirectional flame transmission protection. The arrester 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 consist of several FLAMEFILTER® (3) and spacers firmly held in a FLAMEFILTER® casing. The PROTEGO® FA-E-IIA1 flame arrester protects against deflagrations and endurance burning (under atmospheric condition up to DN 200 / 8”) of explosion group IIA1 - methane (former designation Expl.gr. I). The PROTEGO® FA-E devices for substances of explosion groups IIA, IIB3 and IIC (NEC groups B, C, and D) are shown on separate pages.

The standard design can be used up to an operating temperature of +60°C / 140°F and up to an absolute operating pressure of 1.1 bar / 15.9 psi. Numerous devices with special approvals can be obtained for higher temperatures and pressures.

Type-approved according to ATEX Directive and EN ISO 16852 as well as other international standards.

Special Features and Advantages

- state of the art design for bio-, sewage- and landfill gas applications
- eccentric design prevents condensate build up
- offers a wide range of applications
- special design for elevated operating pressures available
- modular design enables each individual FLAMEFILTER® to be replaced
- easy to maintain and the FLAMEFILTER® can be quickly removed and installed
- eccentric design eases installation close to floors and walls
- provides protection against deflagrations and endurance burning for explosion group IIA1- methane (former designation Expl.gr. I)
- bidirectional operation as well as any direction of flow and installation position
- endurance burning proof under atmospheric conditions up to DN 200 / 8” and therefore the installation of temperature sensors is not required
- installation of temperature sensors is possible
- cost efficient spare parts

Design and Specifications

There are three different designs:

Basic deflagration flame arrester design	**FA-E - –**
Deflagration flame arrester with integrated temperature sensor* for additional protection against short-time burning from one side	**FA-E - T**
Deflagration flame arrester with two integrated temperature sensors* for additional protection against short-time burning from both sides	**FA-E - TB**

Additional special devices available upon request.

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

Table 1: Dimensions Dimensions in mm / inches

To select the nominal size (DN), use the flow capacity charts on the following pages.

DN	25 / 1"	32 / 1¼"	40 / 1½"	50 / 2"	65 / 2½"	80 / 3"	100 / 4"	125 / 5"	150 / 6"	200 / 8"	250 / 10"	300 / 12"
a	304 / 11.97	304 / 11.97	310 / 12.20	314 / 12.36	360 / 14.17	364 / 14,33	370 / 14.57	435 / 17.09	440 / 17.32	450 / 17.72	480 / 18.90	500 / 19.69
b	29 / 1.14	29 / 1.14	29 / 1.14	29 / 1.14	38 / 1.49	38 / 1.49	39 / 1.53	65 / 2.56	65 / 2.56	55 / 2.17	58 / 2.28	60 / 2.36
c	185 / 7.28	185 / 7.28	210 / 8.27	210 / 8.27	250 / 9.84	250 / 9.84	275 / 10.83	385 / 15.16	385 / 15.16	450 / 17.72	500 / 19.69	575 / 22.64
d	400 / 15.75	400 / 15.75	410 / 16.14	410 / 16.14	440 / 17.32	440 / 17.32	460 / 18.11	520 / 20.47	520 / 20.47	540 / 21.26	570 / 22.44	600 / 23.62

Table 2: Selection of the explosion group

MESG	Expl. Gr. (IEC/CEN)
≥ 1.14 mm	IIA1 (I)*

Special approvals upon request.

former designation Expl.gr. I

Table 3: Selection of max. operating pressure (bar / psi)

Expl.Gr.	DN	25 / 1"	32 / 1¼"	40 / 1½"	50 / 2"	65 / 2½"	80 / 3"	100 / 4"	125 / 5"	150 / 6"	200 / 8"	250 / 10"	300 / 12"
IIA1 (I)	P_{max}	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5	1.9 / 27.5

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

Table 4: Specification of max. operating temperature

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

Higher operating temperatures upon request.

Table 5: Material selection for housing

Design	B	C
Housing	Steel	Stainless Steel
Gasket	PTFE	PTFE
Flame arrester unit	A, C	C

The housing can also be delivered in carbon steel with an ECTFE coating.
Special materials upon request.

Table 6: Material combinations of the flame arrester unit

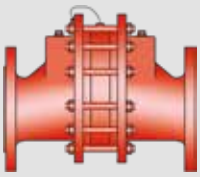
Design	A	C
FLAMEFILTER® casing	Steel	Stainless Steel
FLAMEFILTER® *	Stainless Steel	Stainless Steel
Spacers	Stainless Steel	Stainless Steel

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

Table 7: Flange connection type

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

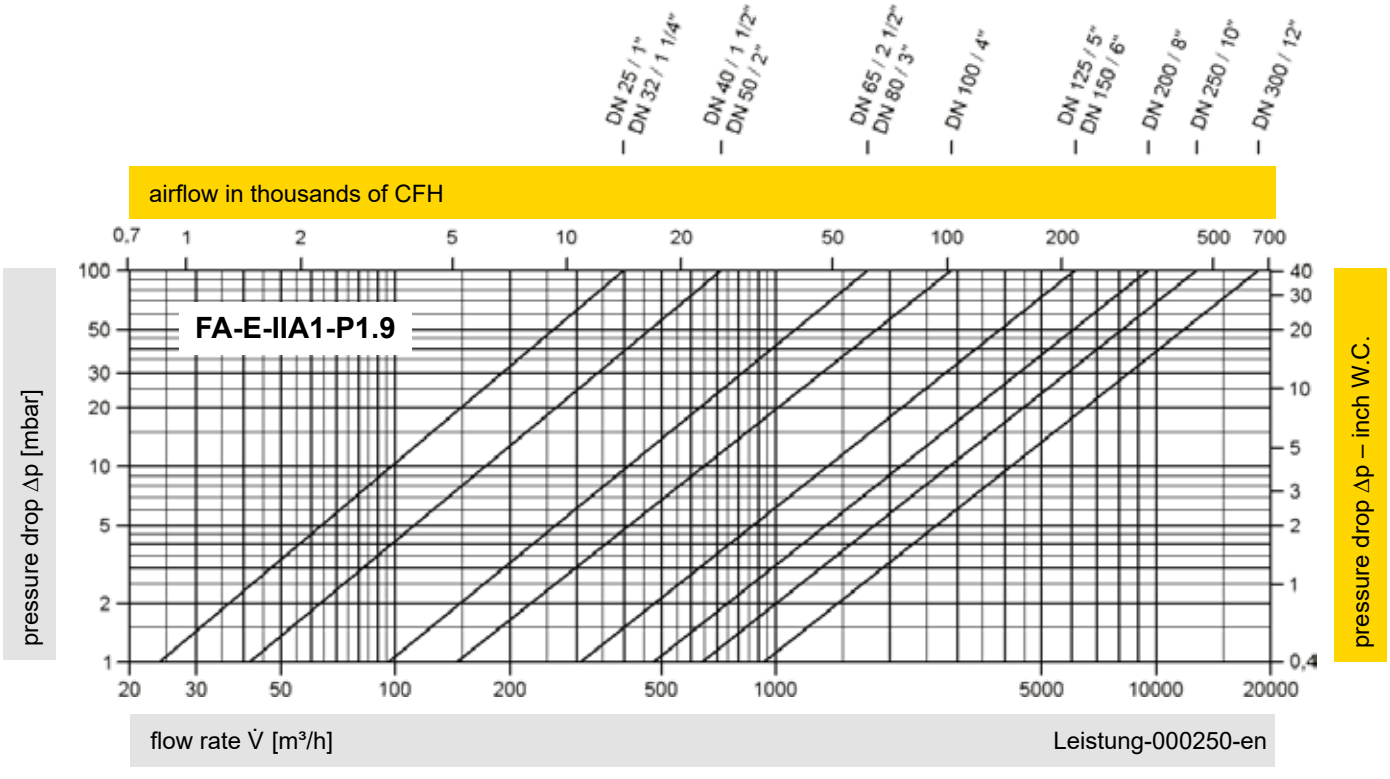
Other types upon request.



In-Line Deflagration Flame Arrester

Flow Capacity Chart

PROTEGO® FA-E-IIA1



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

Volume flow V̇ 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.”