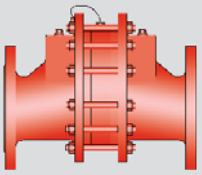
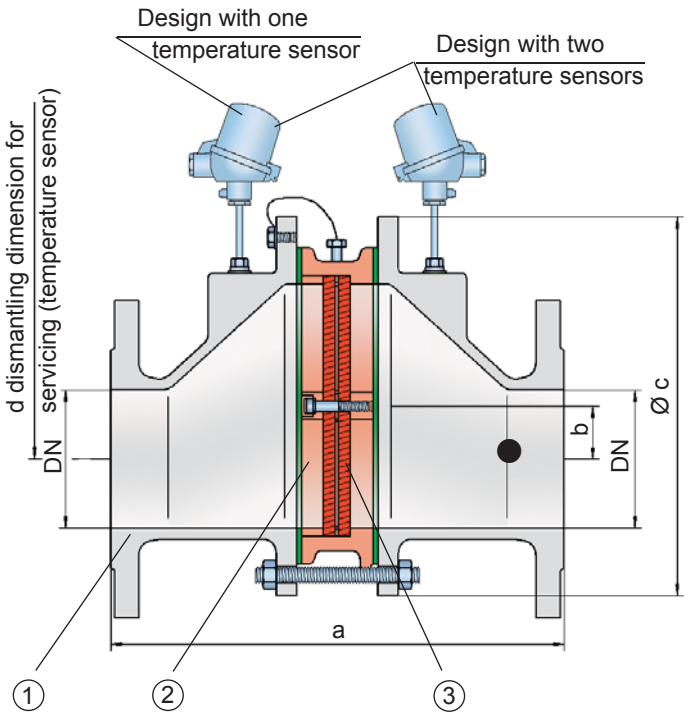


In-Line Deflagration Flame Arrester

eccentric design,
bidirectional

PROTEGO® FA-E



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

Function and Description

The PROTEGO® FA-E series of in-line deflagration flame arresters is designed with an eccentric housing to automatically drain condensate build up in the housing. Due to its eccentric design the device can be installed in pipelines that run close to floors or walls and low points, where condensate can collect within the piping system, can be avoided. 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 of explosion groups IIA and IIB3 (NEC groups D to C) and $(L/D)_{max} \leq 30$ for explosion group IIC (NEC group B).

The devices are symmetrical and offer bidirectional flame transmission protection. The arrester essentially consists of two housing parts (1) and a 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® cage. The number of FLAMEFILTER® and their gap size depends arrester´s conditions of use.

By indicating the operating parameters such as temperature, pressure, explosion group and the composition of the fluid, the optimum deflagration flame arrester can be selected from a series of approved devices. The PROTEGO® FA-E series of deflagration flame arresters is available for substances from explosion groups IIA to IIC (NEC groups D to B).

The standard design can be used up to an operating temperature of +60°C / 140°F and an absolute operating pressure up to 1.1 bar / 15.9 psi. Devices with special approval can be obtained for higher pressures (see table 3) and higher temperatures 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

- eccentric design prevents condensate build up
- special design for elevated operating temperatures and pressures available
- modular design enables each individual FLAMEFILTER® to be replaced
- service friendly: FLAMEFILTER® can be cleaned easily
- eccentric design eases installation close to floors and walls
- bidirectional flame transmission proof design
- protects against deflagrations for all explosion groups IIA, IIB3 and IIC (NEC groups D, C and B)
- modular design reduces spare parts cost

Design and Specifications

There are three different designs:

Basic in-line deflagration flame arrester	**FA-E -** –
In-line deflagration flame arrester with integrated temperature sensor* as additional protection against short-time burning from one side	**FA-E -** T
In-line 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

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"
IIA	a	304 / 11.97	304 / 11.97	310 / 12.20	314 / 12.36	360 / 14.17	364 / 14,33	370 / 14.57	434 / 17.09	440 / 17.32	450 / 17.72	480 / 18.90	500 / 19.69
IIB3	a	304 / 11.97	304 / 11.97	310 / 12.20	314 / 12.36	360 / 14.17	364 / 14,33	370 / 14.57	434 / 17.09	440 / 17.32	450 / 17.72	480 / 18.90	500 / 19.69
IIC	a	304 / 11.97	304 / 11.97	321 / 12.64	325 / 12.80	371 / 14.61	375 / 14.76	381 / 15.00	445 / 17.52	451 / 17.76	461 / 18.15	491 / 19.33	511 / 20.12
	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)	Gas Group (NEC)	
> 0.90 mm	IIA	D	Special approvals upon request
≥ 0.65 mm	IIB3	C	
< 0.50 mm (> 0.50 mm)	IIC (IIB)	B	

Table 3: Selection of max. operating pressure

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"
IIA	P_{max}	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2
IIB3	P_{max}	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2	1.6 / 23.2
IIC	P_{max}	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.2 / 17.4	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9	1.1 / 15.9

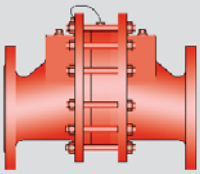
P_{max} = maximum allowable operating pressure in bar / psi absolute, higher operating pressure upon request

Table 4: Specification of max. operating temperature

≤ 60°C / 140°F	Tmaximum allowable operating temperature in °C	higher operating temperatures upon request
-	Designation	

Table 5: Material selection for housing

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



In-Line Deflagration Flame Arrester

eccentric design,
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PROTEGO® FA-E

Table 6: Material combinations of the flame arrester unit

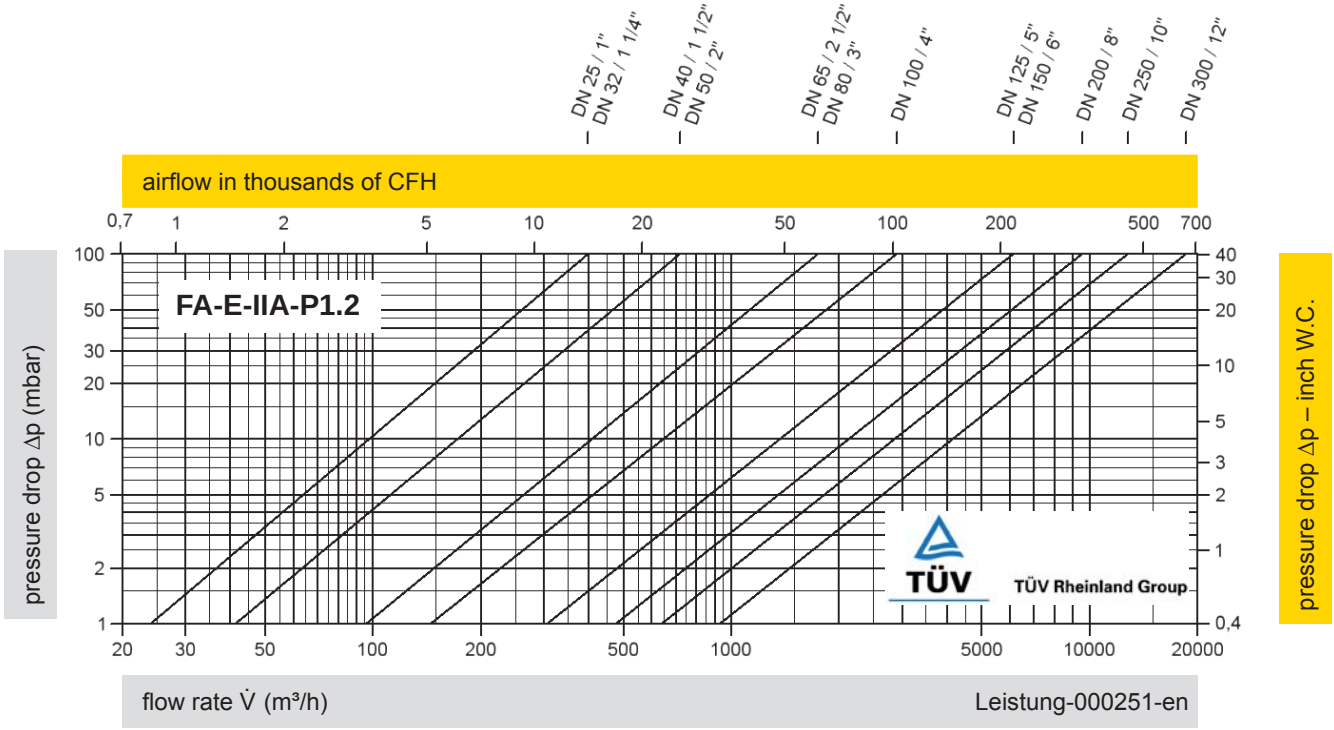
Design	A	C	D
FLAMEFILTER® cage	Steel	Stainless Steel	Hastelloy
FLAMEFILTER® *	Stainless Steel	Stainless Steel	Hastelloy
Spacers	Stainless Steel	Stainless Steel	Hastelloy

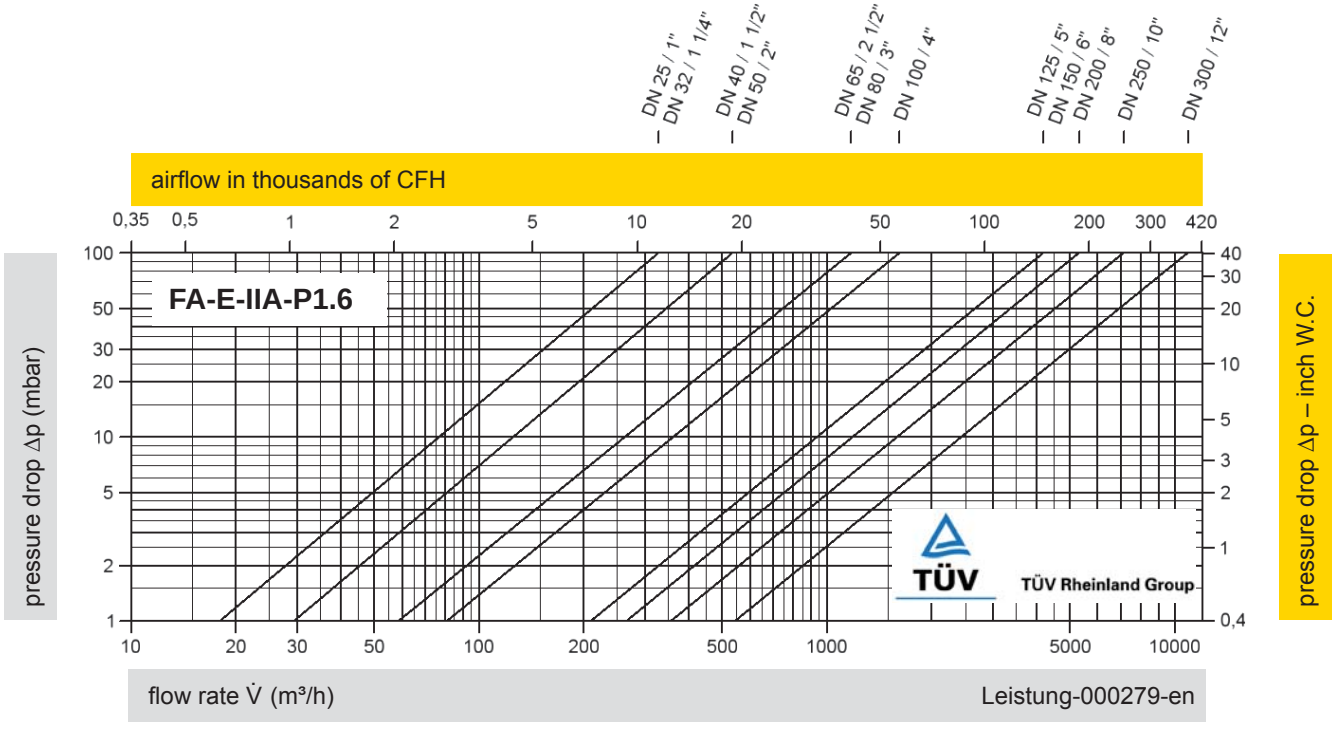
*the FLAMEFILTER® is also available in the materials Tantalum, Inconel, Copper, etc. when the listed housing and cage materials are used.

Special materials upon request.

Table 7: Flange connection type

EN 1092-1; Form B1	other types upon request
ASME B16.5; 150 lbs RFSF	





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 ISO 6358 (20°C, 1bar).
Conversion to other densities and temperatures refer to Vol. 1: “Technical Fundamentals”.

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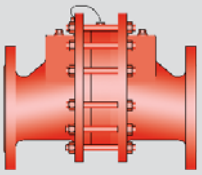
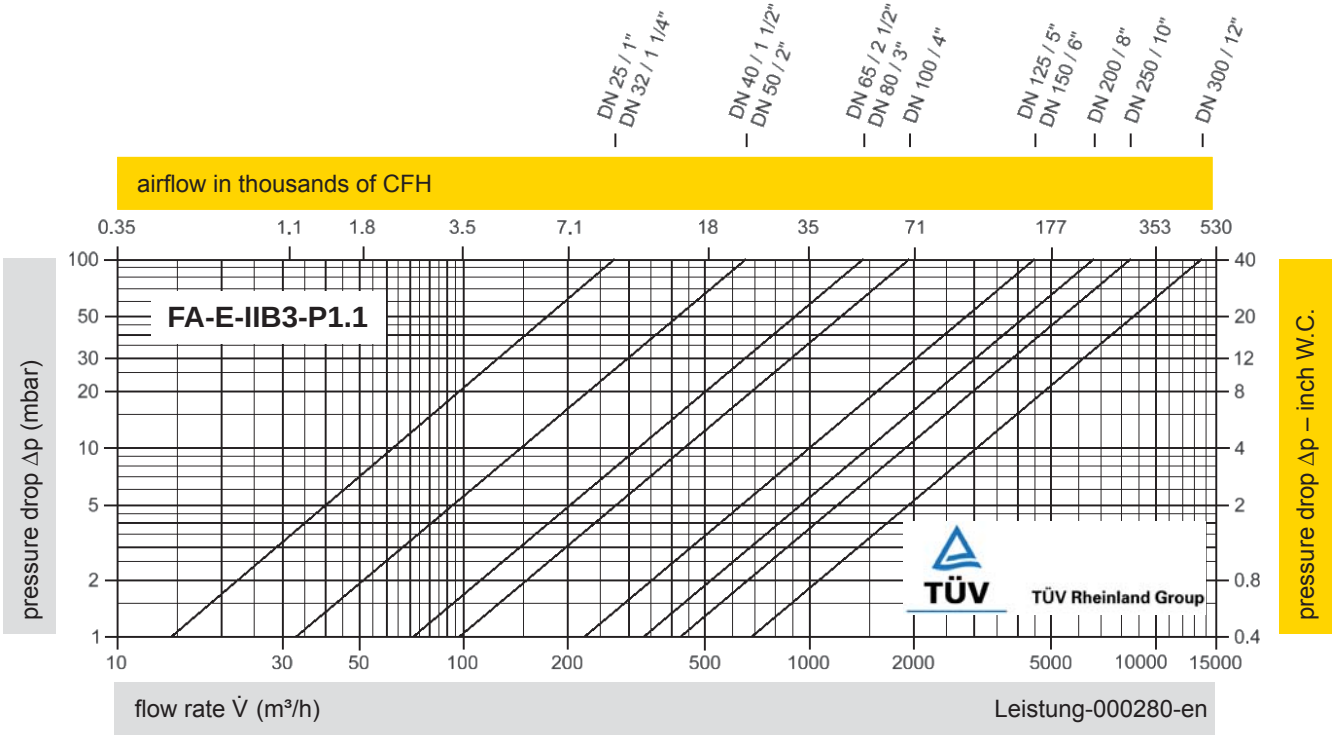
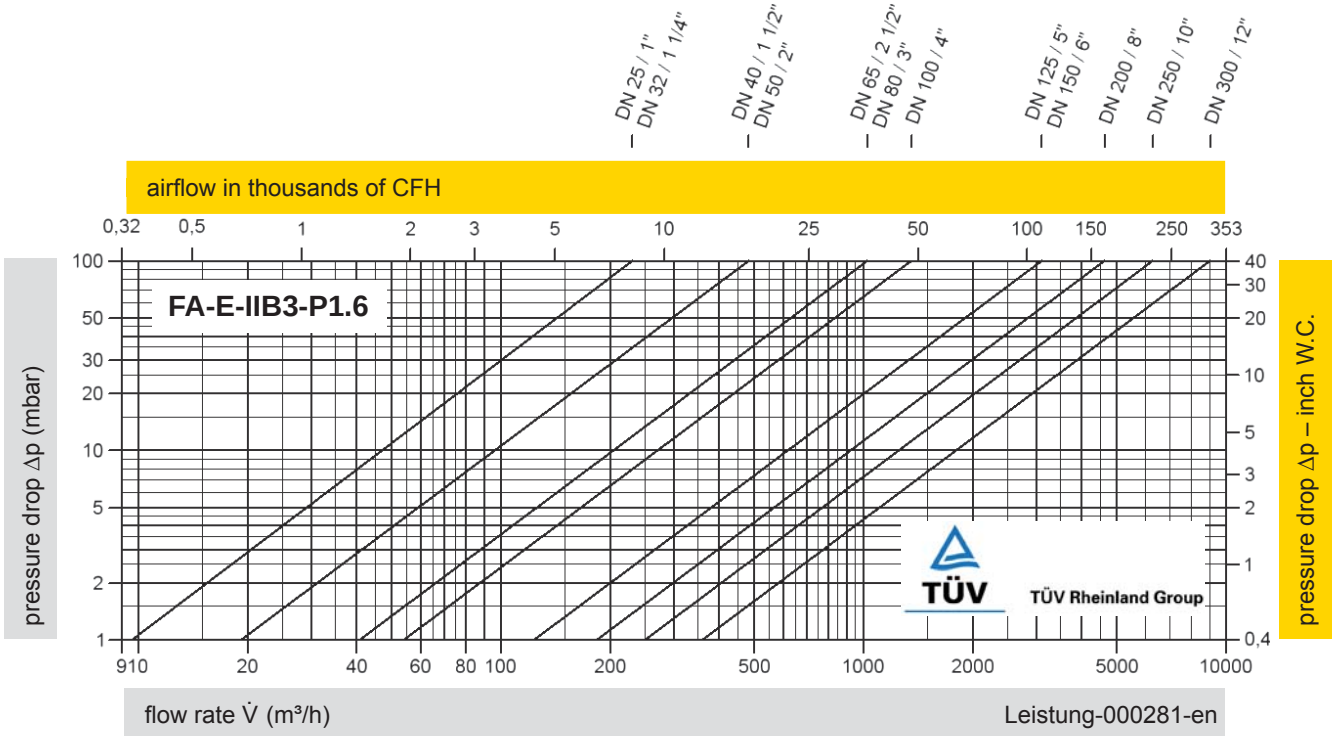


In-Line Deflagration Flame Arrester

Flow Capacity Charts

PROTEGO® FA-E





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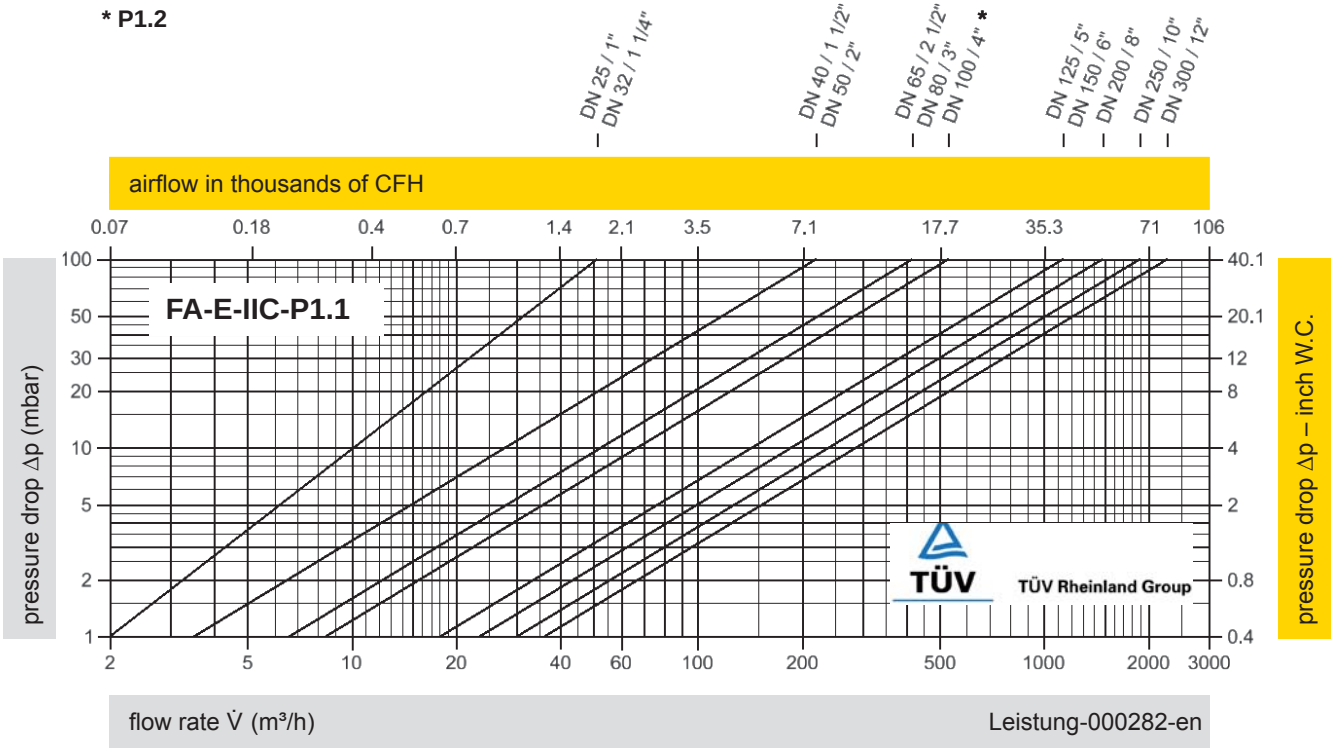
* P1.2
DN 25 / 1"
DN 32 / 1 1/4"
DN 40 / 1 1/2"
DN 50 / 2"
DN 65 / 2 1/2"
DN 80 / 3"
DN 100 / 4" *
DN 125 / 5"
DN 150 / 6"
DN 200 / 8"
DN 250 / 10"
DN 300 / 12"
airflow in thousands of CFH
0.07
0.18
0.4
0.7
1.4
2.1
3.5
7.1
17.7
35.3
71
106
FA-E-IIC-P1.1
pressure drop Δp (mbar)
100
50
30
20
10
5
2
1
pressure drop Δp – inch W.C.
40.1
20.1
12
8
4
2
0.8
0.4
TÜV
TÜV Rheinland Group
2
5
10
20
40
60
100
200
500
1000
2000
3000
flow rate V̇ (m³/h)
Leistung-000282-en