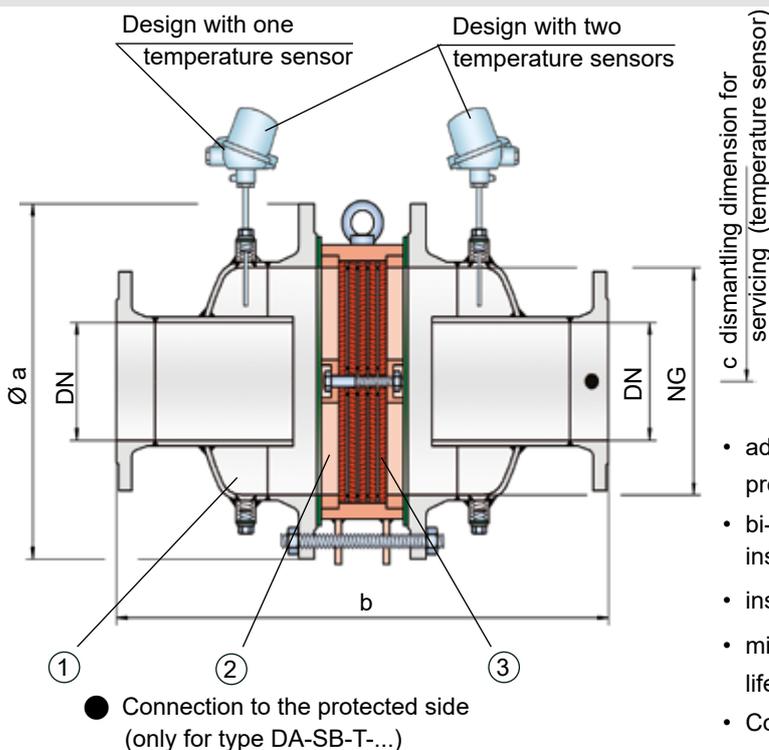


In-Line Detonation Flame Arrester

for stable detonations and deflagrations in a straight through design with shock tube, bi-directional

PROTEGO® DA-SB



Function and Description

The in-line detonation flame arresters type PROTEGO® DA-SB 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. 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 number of FLAMEFILTER® discs and their gap size depends on the arrester's intended use.

By specifying the operating conditions, such as the temperature, pressure, explosion group, and the composition of the fluid, the optimum detonation arrester can be selected from a series of approved devices. The PROTEGO® DA-SB flame arresters are available for all explosion groups.

The standard design can be used with an operating temperature of up to +60°C / 140°F and an absolute operating pressure up to bar / 15.9 psi. Numerous devices with special approval 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 performance due to the patented Shock Wave Guide Tube Effect (SWGTE)
- low number of FLAMEFILTER® discs due to the patented Shock Wave Guide Tube Effect (SWGTE)
- modular design enables replacement of the individual FLAMEFILTER® discs
- different designs allow scalable pressure loss over the area of the FLAMEFILTER®
- maintenance-friendly design
- advanced design for higher operating temperatures and pressures
- bi-directional operation, as well as any flow direction and installation position
- installation of temperature sensors possible
- minimal pressure loss resulting in low operating and lifecycle costs
- Cost-effective spare parts
- installation of stabilized FLAMEFILTER® possible
- use of maintenance-friendly PROTEGO® flame arrester unit possible

Design Types and Specifications

There are four different designs available:

Basic in-line detonation flame arrester **DA-SB - [] - []**

In-line detonation flame arrester with integrated temperature sensor* as additional protection against short-time burning from one side **DA-SB - [T] - []**

In-line detonation flame arrester with two integrated temperature sensors* for additional protection against short-time burning from both sides **DA-SB - [TB] - []**

In-line detonation flame arrester with heating jacket **DA-SB - [H] - []**

Additional special flame arresters 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 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 for improved flow capacity upon request.											
standard (special sizes up to NG 2000/80", DN 1000/40" available)													
NG	150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	700 28"	800 32"	1000 40"	1200 48"	1600 64"	
DN	≤ 50 2"	65, 80 2 1/2", 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 350 14"	≤ 400 16"	≤ 500 20"	≤ 600 24"	800 32"	
a	285 / 11.22	285 / 11.22	340 / 13.39	445 / 17.52	565 / 22.24	670 / 26.38	780 / 30.71	895 / 35.24	1015 / 39.96	1230 / 48.43	1455 / 57.28	1915 / 75.39	
IIA-P1,1	388 / 15.28	388 / 15.28	476 / 18.74	626 / 24.65	700 / 27.56	800 / 31.50*	1000 / 39.37*	1200 / 47.24	1400 / 55.12	1600 / 62.99	1800 / 70.87	2200 / 86.61**	
IIA-P1,4-X3	400 / 15.75	400 / 15.75	488 / 19.21	626 / 24.65	724 / 28.50	800 / 31.50	1000 / 39.37	1200 / 47.24	1400 / 55.12				
b													
IIB3-P1,1	400 / 15.75	412 / 16.22	500 / 19.69	650 / 25.59	724 / 28.50	824 / 32.44	1000 / 39.37	1200 / 47.24	1400 / 55.12	1600 / 62.99	1800 / 70.87		
IIB3-P1,4-X3	412 / 16.22	412 / 16.22	512 / 20.16	650 / 25.59	724 / 28.50	824 / 32.44	1000 / 39.37	1200 / 47.24	1400 / 55.12				
IIC-P1,1	400 / 15.75	400 / 15.75	500 / 19.69	638 / 25.12	700 / 27.56	788 / 31.02	1000 / 39.37***	1200 / 47.24***	1400 / 55.12***				
c													
	500 / 19.69	500 / 19.69	520 / 20.47	570 / 22.44	620 / 24.41	670 / 26.38	720 / 28.35	770 / 30.31	820 / 32.28	950 / 37.40	1050 / 41.34	1250 / 49.21	

* dimension b only for P1.4 / 20.3

** dimension b only for P1.2 / 17.4

*** EN 12874

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	
< 0,50 mm	IIC	B	

Table 3: Selection of max. operating pressure

NG		150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	700 28"	800 32"	1000 40"	1200 48"	1600 64"	
DN		≤ 50 2"	65, 80 2 1/2", 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 350 14"	≤ 400 16"	≤ 500 20"	≤ 600 24"	800 32"	
Expl. Gr.	IIA	P _{max}	2.1 / 30.5	2.1 / 30.5	2.1 / 30.5	2.1 / 30.5	2.1 / 30.5	2.1 / 30.5	1.4 / 20.3	1.4 / 20.3	1.4 / 20.3	1.1 / 15.9	1.1 / 15.9	1.2 / 17.4
	IIB3	P _{max}	1.4 / 20.3	1.4 / 20.3	1.4 / 20.3	1.8 / 26.1	1.8 / 26.1	1.8 / 26.1	1.8 / 26.1	1.4 / 20.3	1.4 / 20.3	1.1 / 15.9	1.1 / 15.9	
	IIC	P _{max}	2.2 / 31.9	2.2 / 31.9	1.1 / 15.9									

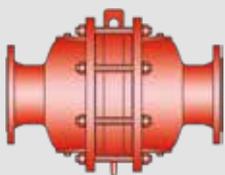
P_{max} = maximum allowable operating pressure in bar / psi absolut; higher operating pressure upon request.

In-between size up to P_{max} upon request.

* Capacity charts upon request.



for safety and environment



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Table 4: Specification of max. operating temperature

≤ 60°C / 140°F	≤ 200°C / 392°F	T _{maximum allowable operating temperature in °C}	Higher operating temperatures upon request.
-	X3	Classification	

Table 5: Material selection for housing

Design	A	B	C	The housing is also available in Steel with ECTFE coating.
Housing	Steel	Stainless Steel	Hastelloy	
Heating jacket (DA-SB-(T)-H-...)	Steel	Stainless Steel	Stainless Steel	
Gasket	PTFE	PTFE	PTFE	
Flame arrester unit	A, B	B, C, D	D	

Special materials upon request.

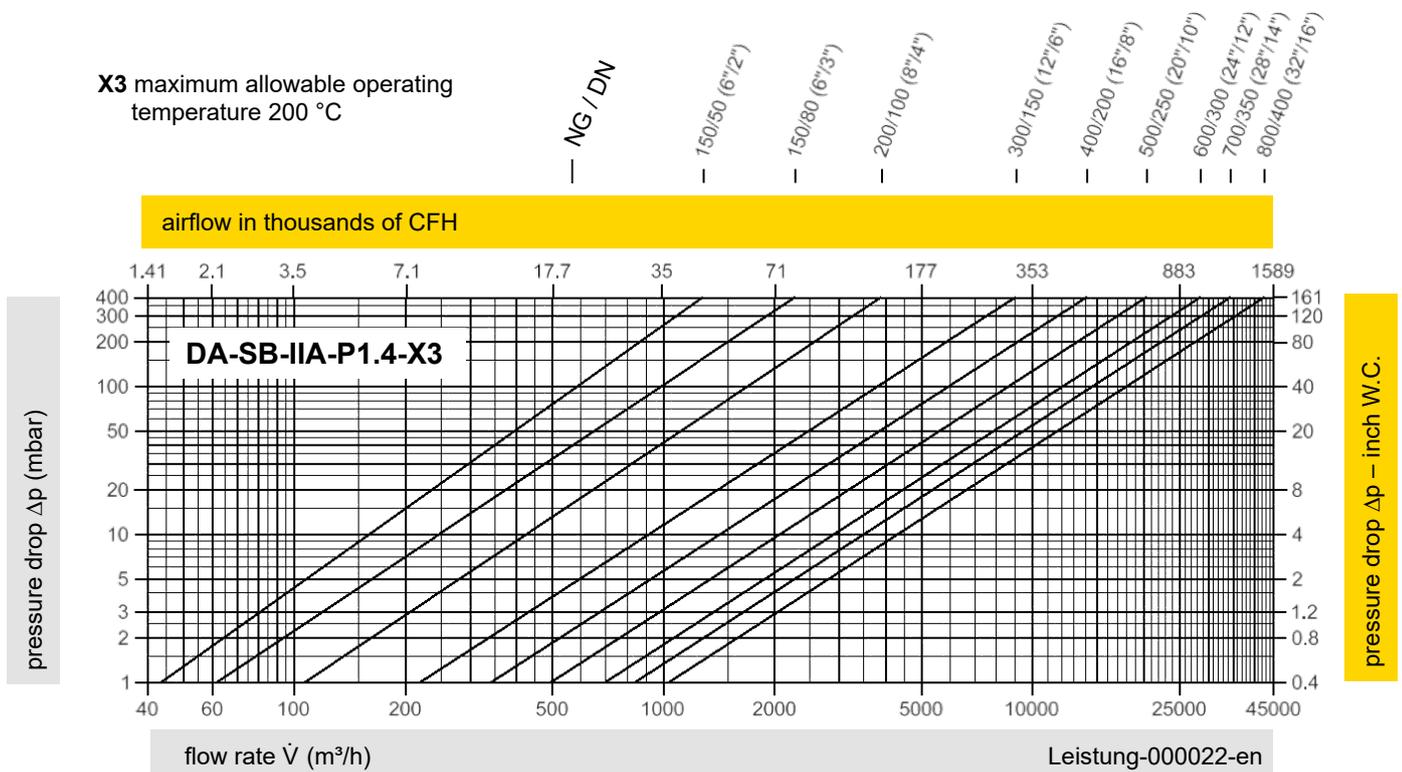
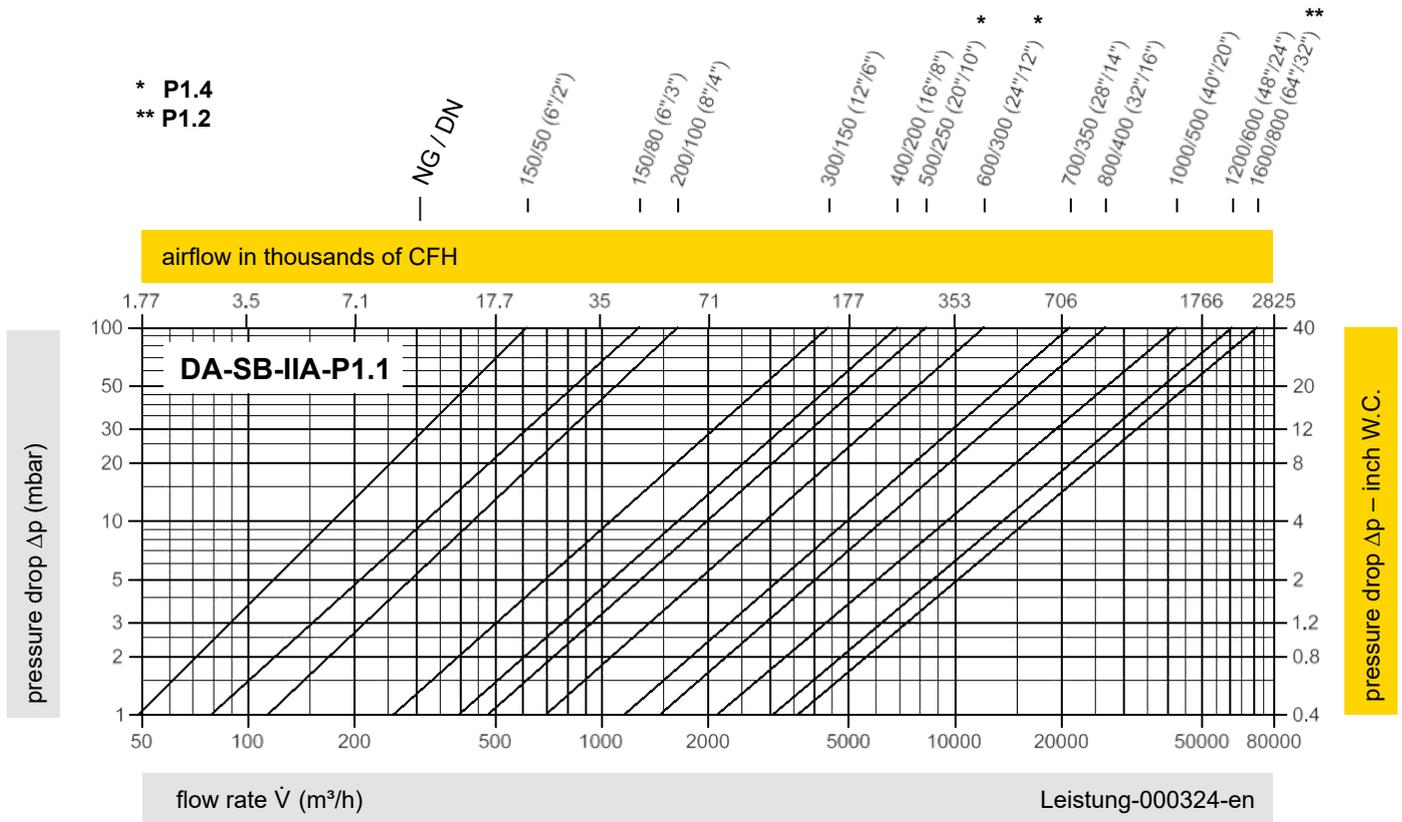
Table 6: Material combinations of the flame arrester unit

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

Special materials upon request.

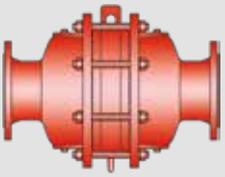
Table 7: Flange connection type

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



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."

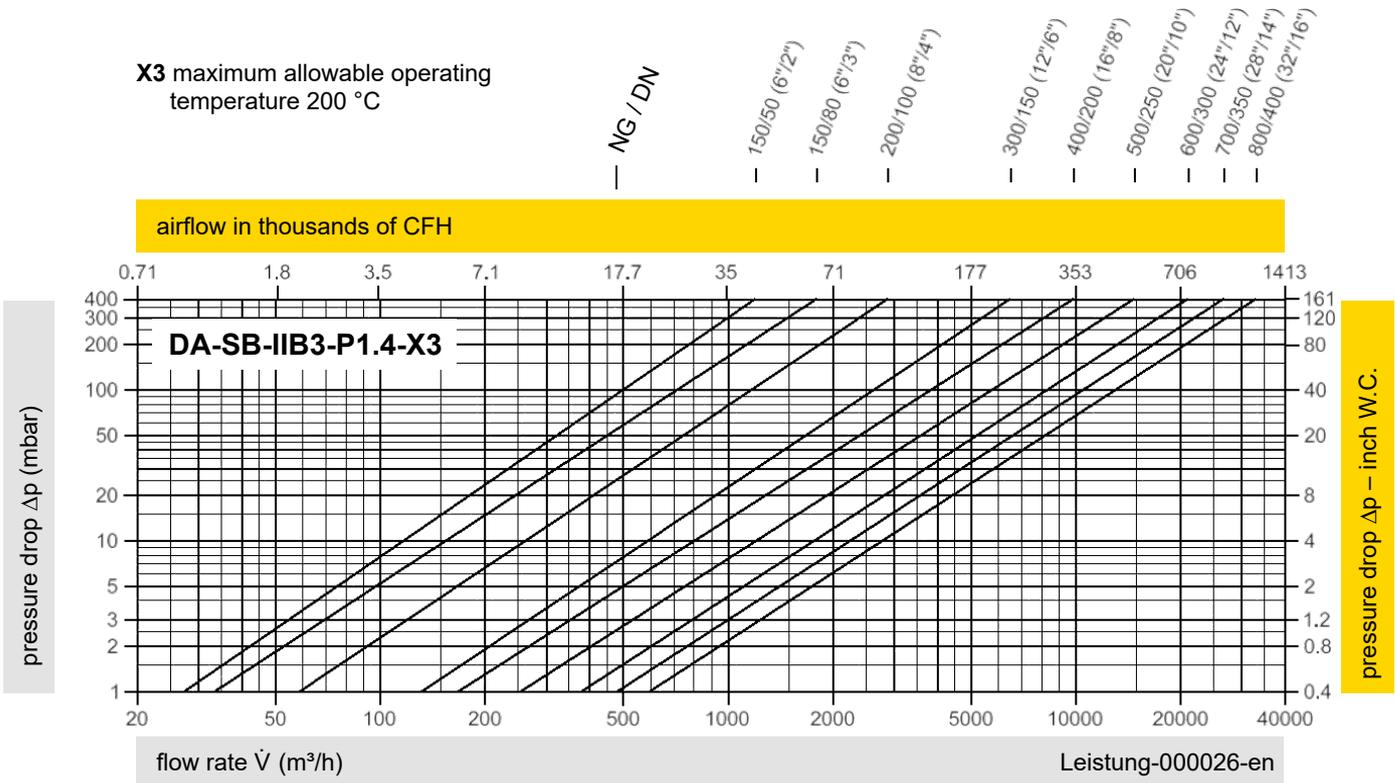
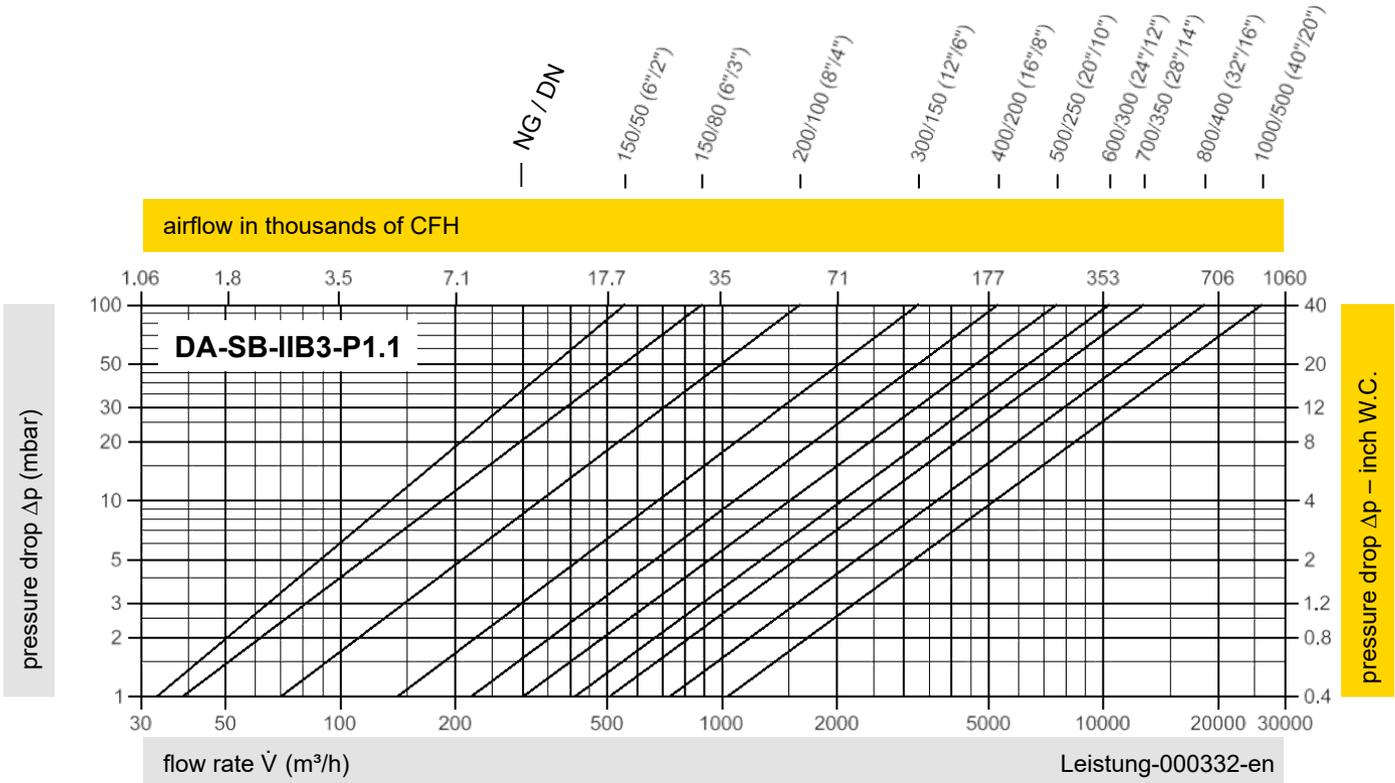




In-Line Detonation Flame Arrester

Flow Capacity Charts

PROTEGO® DA-SB



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."

