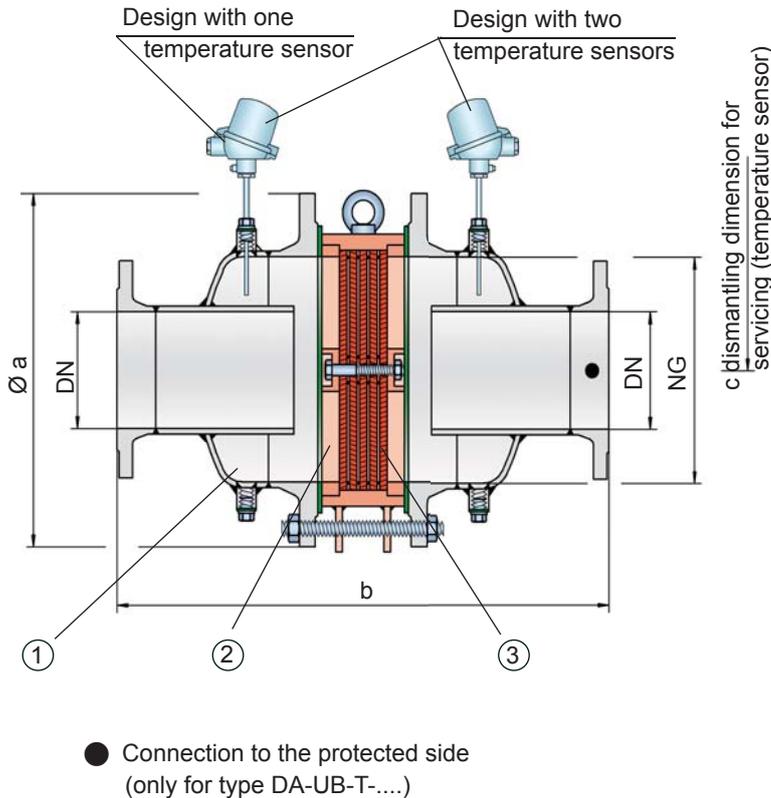


In-Line Detonation Flame Arrester

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

PROTEGO® DA-UB



Function and Description

The in-line detonation flame arresters type PROTEGO® DA-UB are the newest generation of flame arresters. On the basis of fluid dynamic and explosion-dynamic calculations and decades of experience from field tests, a line was developed that offers minimum pressure loss and maximum safety. The device uses the *Shock Wave Guide Tube Effect (SWGTE)* to separate the flame front and shock wave. The result is an in-line detonation flame arrester without a classic shock absorber, and the use of flame-extinguishing elements is minimized.

The devices are symmetrical and offer bidirectional flame arresting for deflagrations, stable and unstable 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® cage. The number of FLAMEFILTER® discs and their gap size depends on the arrester's conditions of use.

By indicating the operating parameters such as temperature, pressure and explosion group and the composition of the fluid, the optimum detonation arrester can be selected from a series of approved devices. PROTEGO® DA-UB flame arresters are available for explosion groups IIA to IIB3 (NEC group D to C MESH ≥ 0.65 mm).

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. Numerous devices with special approval can be supplied for higher pressures (see table 3) and higher temperatures.

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 from the patented *Shock Wave Guide Tube Effect (SWGTE)*
- less number of FLAMEFILTER® discs from the use of the patented shock tube (SWGTE)
- modular flame arrester unit enables each individual FLAMEFILTER® discs to be replaced and cleaned
- different series allow increase of FLAMEFILTER® size for given flange connection resulting in lower pressure drop across the device
- service-friendly design
- expanded application range for higher operating temperatures and pressures
- bidirectional operation as well as any direction of flow and installation position
- possible installation of temperature sensors
- minimum pressure loss and associated low operating and life-cycle cost
- cost efficient spare parts

Design Types and Specifications

There are four different designs available:

Basic in-line detonation flame arrester DA-UB - -

In-line detonation flame arrester with integrated temperature sensor* as additional protection against short time burning DA-UB - -

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

In-line detonation flame arrester with heating jacket DA-UB - -

Additional special flame arresters upon request

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

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										
NG	150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	700 28"	800 32"	1400 56"
DN	≤ 50 2"	80 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 350 14"	≤ 400 16"	≤ 600 24"
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	1675 / 65.94
b	IIA -P1.1				700 / 27.56	800 / 31.50	1000 / 39.37	1200 / 47.24	1400 / 55.12	2200 / 86.61
	IIA-P1.2	388 / 15.28	388 / 15.28	488 / 19.21	626 / 24.65					
	IIB3-P1.1			500 / 19.69	638 / 25.12	724 / 28.50	824 / 32.44	1000 / 39.37	1200 / 47.24	1400 / 55.12
	IIB3-P1.2	388 / 15.28	388 / 15.28							
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	1060 / 41.73

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

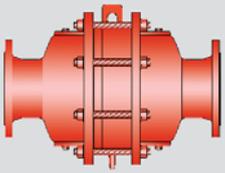
		NG	150 6"	150 6"	200 8"	300 12"	400 16"	500 20"	600 24"	700 28"	800 32"	1400 56"
		DN	≤ 50 2"	80 3"	≤ 100 4"	≤ 150 6"	≤ 200 8"	≤ 250 10"	≤ 300 12"	≤ 350 14"	≤ 400 6"	≤ 600 24"
Expl. Gr.	IIA	P _{max}	1.8 / 26.1	1.8 / 26.1	1.6 / 23.2	1.6 / 23.2	1.1 / 15.9	1.6/ 23.2				
	IIB3	P _{max}	1.5 / 21.7	1.5 / 21.7	1.5 / 21.7	1.5 / 21.7	1.1 / 15.9					

P_{max} = maximum allowable operating pressure in bar / psi (absolute), higher operating pressure upon request
in-between size up to P_{max} upon request

Table 4: Specification of max. operating temperature

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





In-Line Detonation Flame Arrester

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

PROTEGO® DA-UB

Table 5: Material selection for housing

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

The housing is also available in Steel with an ECTFE coating.

Special materials upon request

Table 6: Material combinations of the 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 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

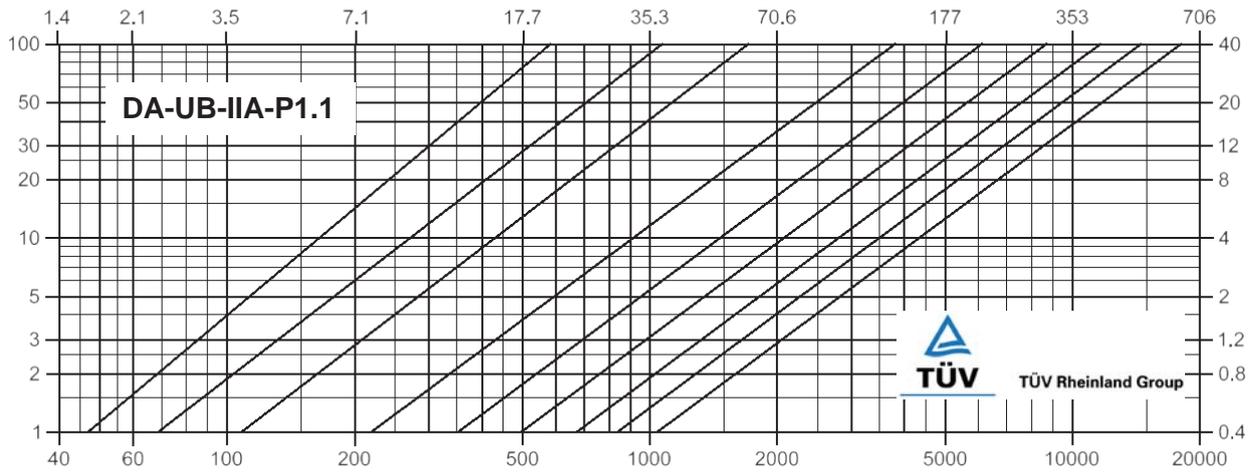
EN 1092-1; Form B1	other types upon request
ASME B16.5; 150 lbs RFSF	

* P1.2

— NG / DN
 — 150/50 (6"/2") *
 — 150/80 (6"/3") *
 — 200/100 (8"/4") *
 — 300/150 (12"/6") *
 — 400/200 (16"/8")
 — 500/250 (20"/10")
 — 600/300 (24"/12")
 — 700/350 (28"/14")
 — 800/400 (32"/16")

airflow in thousands of CFH

pressure drop Δp (mbar)



pressure drop Δp – inch W.C.

flow rate \dot{V} (m³/h)

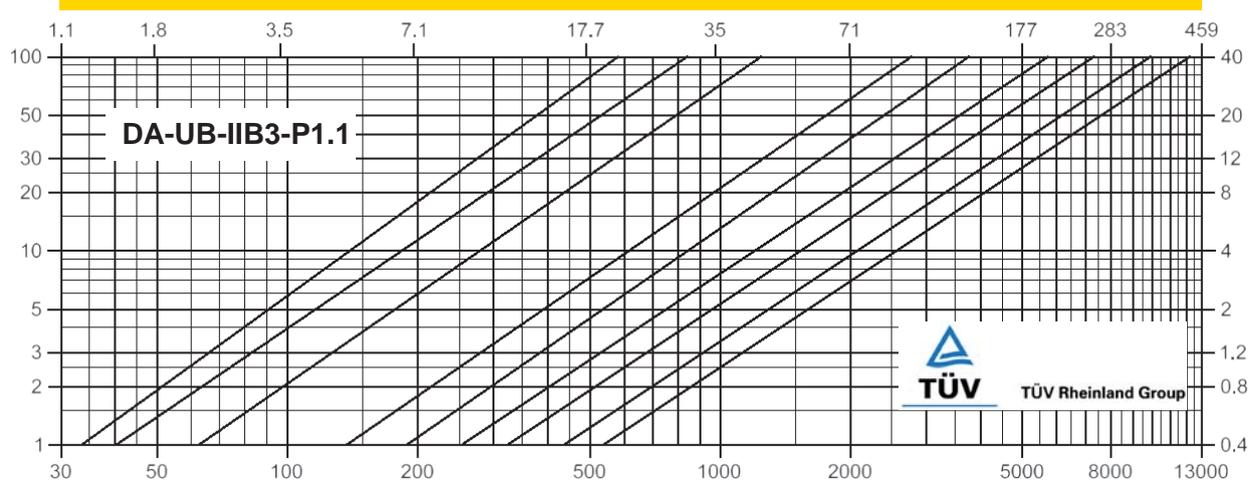
Leistung-000349-en

* P1.2

— NG / DN
 — 150/50 (6"/2") *
 — 150/80 (6"/3") *
 — 200/100 (8"/4") *
 — 300/150 (12"/6")
 — 400/200 (16"/8")
 — 500/250 (20"/10")
 — 600/300 (24"/12")
 — 700/350 (28"/14")
 — 800/400 (32"/16")

airflow in thousands of CFH

pressure drop Δp (mbar)



pressure drop Δp – inch W.C.

flow rate \dot{V} (m³/h)

Leistung-000350-en

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



for safety and environment