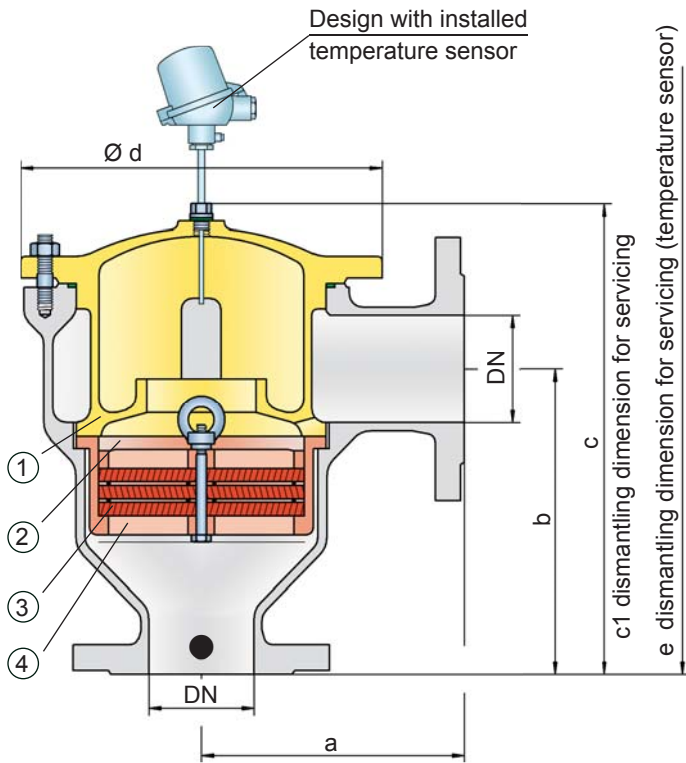


In-Line Detonation Flame Arrester

for unstable and stable detonations and deflagrations in right angle design with a shock absorber, unidirectional

PROTEGO® DR/EU



● Connection to the protected side

Function and Description

The PROTEGO® DR/EU series of in-line detonation flame arresters represents a further development of PROTEGO® flame arresters DR/ES used successfully for decades in industry. The device protects against deflagrations, stable and unstable detonations. The classic right angle design offers considerable cost and maintenance advantages in comparison to a straight through design.

Once a detonation enters the flame arrester, energy is absorbed from the detonation shock wave by the integrated shock absorber (1) before the flame is extinguished in the narrow gaps of the FLAMEFILTER® (3).

The PROTEGO® flame arrester unit (2) consists of several FLAMEFILTER® discs and spacers firmly held in the FLAMEFILTER® cage (4). The gap size and number of FLAMEFILTER® discs are determined by the operating data parameters of the mixture flowing in the line (explosion group, pressure, temperature). This device is available explosion groups from 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 acc. to table 3. Numerous special approvals can be obtained for higher temperatures and pressures 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

- minimum number of FLAMEFILTER® discs due to the effective shock absorber
- quick removal and installation of the complete PROTEGO® flame arrester unit and of the FLAMEFILTER® discs in the cage
- modular flame arrester unit enables each individual FLAMEFILTER® discs to be replaced and cleaned
- provides protection from deflagration as well as from stable and unstable detonation
- the right angle design saves pipe elbows
- extended application range for higher operating temperatures and pressures
- minimum pressure loss and hence low operating and lifecycle costs
- cost efficient spare parts

Design Types and Specifications

There are four different designs available:

Basic in-line detonation flame arrester	DR/EU-	<input type="checkbox"/>	<input type="checkbox"/>
In-line detonation flame arrester with integrated temperature sensor* as additional protection against short time burning	DR/EU-T	<input type="checkbox"/>	<input type="checkbox"/>
In-line detonation flame arrester with heating jacket	DR/EU-H	<input type="checkbox"/>	<input type="checkbox"/>
in-line detonation flame arrester with integrated temperature sensor* and heating jacket	DR/EU-H-T	<input type="checkbox"/>	<input type="checkbox"/>

*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), please use the flow capacity charts on the following pages

DN	25 / 1"	32 / 1 ¼"	40 / 1 ½"	50 / 2"	65 / 2 ½"	80 / 3"	100 / 4"	125 / 5"	150 / 6"
a	125/4.92	125/4.92	153/6.02	155/6.10	198/7.80	200/7.87	250/9.84	332/13.07	335/13.19
b	140/5.51	140/5.51	183/7.20	185/7.28	223/8.78	225/8.86	290/11.42	357/14.06	360/14.17
c	210/8.27	210/8.27	290/11.42	290/11.42	365/14.37	365/14.37	440/17.32	535/21.06	535/21.06
c1	285/11.22	285/11.22	395/15.55	395/15.55	500/19.69	500/19.69	595/23.43	750/29.53	750/29.53
d	150/5.91	150/5.91	210/8.27	210/8.27	275/10.83	275/10.83	325/12.80	460/18.11	460/18.11
e	495/19.49	495/19.49	600/23.62	600/23.62	705/27.76	705/27.76	795/31.30	950/37.40	950/37.40

Table 2: Selection of the explosion group

MESG	Expl. Gr. (IEC/CEN)	Gas Group (NEC)	Special approvals upon request
> 0,90 mm	IIA	D	
≥ 0,75 mm	IIB2	C	
≥ 0,65 mm	IIB3	C	

Table 3: Selection of max. operating pressure

		DN	25 / 1"	32 / 1 ¼"	40 / 1 ½"	50 / 2"	65 / 2 ½"	80 / 3"	100 / 4"	125 / 5"	150 / 6"
Exp. Gr.	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	1.5 / 21.7	1.2 / 17.4	1.2 / 17.4
	IIB2	P _{max}								1.4 / 20.3	1.4 / 20.3
	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	1.4 / 20.3	1.2 / 17.4*	1.2 / 17.4*

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

* special flame arrester unit

Table 4: Specification of max. operating temperature

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

Table 5: Material selection for housing

Design	B	C	D	* for devices exposed to elevated temperatures above 150°C / 302°F, gaskets made of PTFE. The housing and cover with the shock absorber can also be delivered in steel with an ECTFE coating.
Housing	Carbon Steel	Stainless Steel	Hastelloy	
Heating jacket (DR/EU-H-(T)-...)	Steel	Stainless Steel	Stainless Steel	
Cover with shock absorber	Steel	Stainless Steel	Hastelloy	
O-Ring	FPM *	PTFE	PTFE	
Flame arrester unit	A	C, D	E	

Special materials upon request

Table 6: Material combinations of the flame arrester unit

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

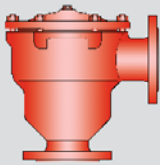
Special materials upon request

Table 7: Flange connection type

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



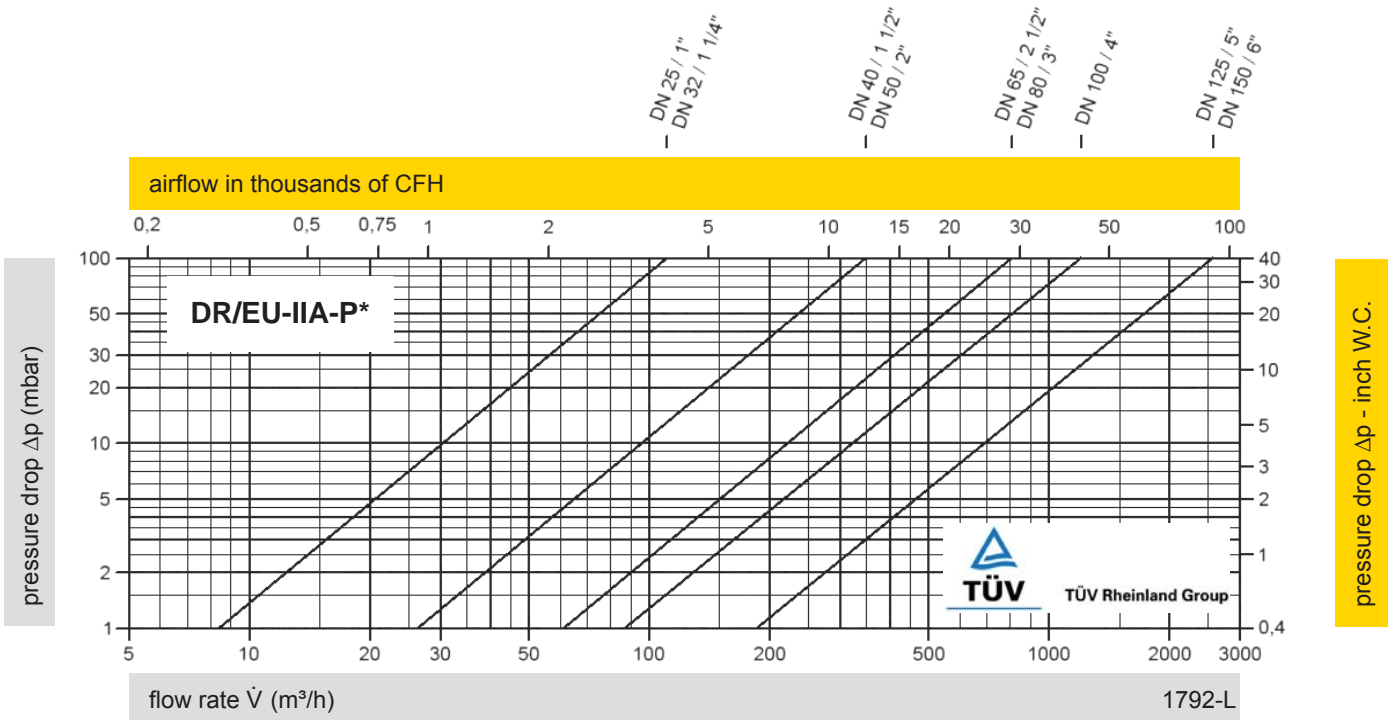
for safety and environment



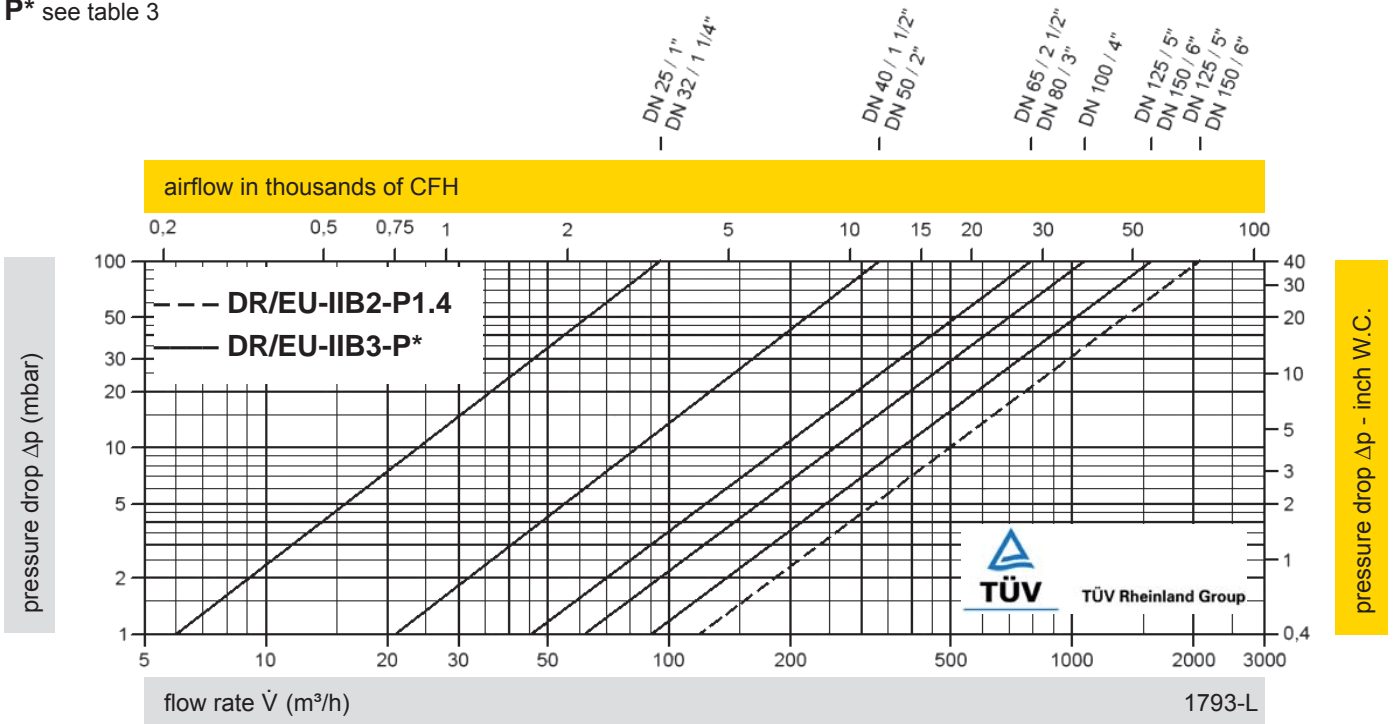
In-Line Detonation Flame Arrester

Flow Capacity Charts

PROTEGO® DR/EU



P* see table 3



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".