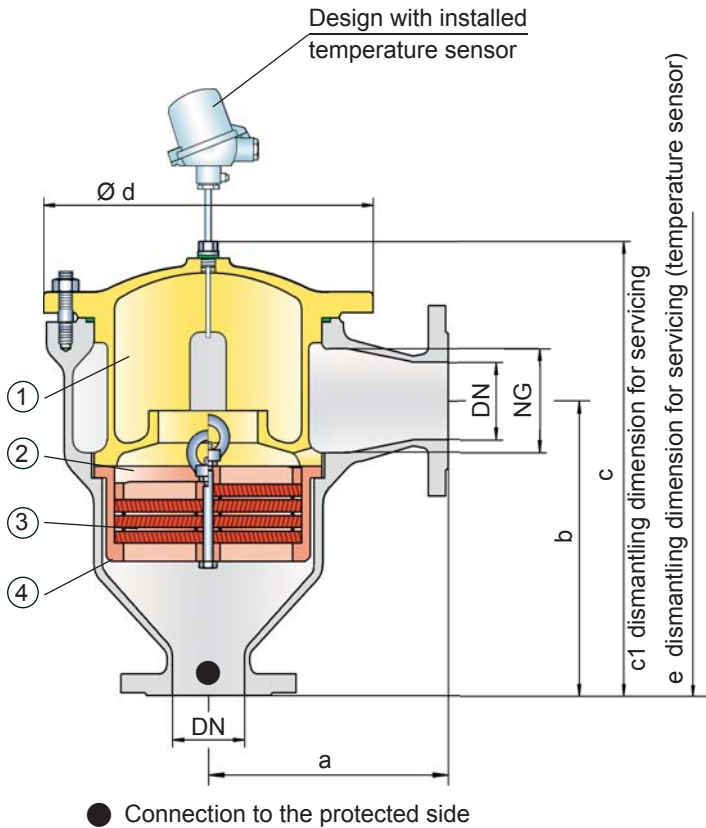


In-Line Detonation Flame Arrester

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

PROTEGO® DR/ES (series 2)



The PROTEGO® DR/ES series 2 was developed for higher flow performance at small flange connection. It is approved at an operating temperature up to +60°C / 140°F and an absolute operating pressure up to 1.2 bar / 17.4 psi. Devices with special approvals can be obtained for higher pressures and higher temperatures upon request.

Type-approved according to 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 FLAMEFILTER® discs in the cage
- due to modular design the FLAMEFILTER® discs can be individually replaced
- the right angle design saves pipe elbows
- extended application range for higher operating temperatures and pressures
- high flow performance at small flange connection
- minimum pressure loss and hence low operating and life-cycle cost
- cost efficient spare parts

Function and Description

The PROTEGO® DR/ES in-line detonation flame arrester has been used for decades in industrial plant construction because its right angle design offers advantages towards maintenance and costs in comparison to most straight designs.

Once a detonation enters the device, 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 of the mixture flowing in the line (explosion group, pressure, temperature). This device is approved for explosion groups from IIA to IIB3 (NEC group D to C MESH ≥ 0.65 mm).

Design Types and Specifications

There are four different designs available:

Basic in-line detonation flame arrester DR/ES- -

In-line detonation flame arrester with integrated temperature sensor* as additional protection against short time burning DR/ES- -

In-line detonation flame arrester with heating jacket DR/ES- -

In-line detonation flame arrester with integrated temperature sensor* against short time burning and heating jacket DR/ES- -

*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

NG	80 / 3"	100 / 4"	150 / 6"
DN	50 / 2"	80 / 3"	100 / 4"
a	200/7.87	250/9.84	335/13.19
b	225/8.86	290/11.42	360/14.07
c	365/14.37	440/17.32	535/21.06
c1	500/19.69	595/23.43	750/29.53
d	275/10.83	325/12.80	460/18.11
e	705/27.76	795/31.30	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	
≥ 0,65 mm	IIB3	C	

Table 3: Selection of max. operating pressure

NG	80 / 3"	100 / 4"	150 / 6"
DN	50 / 2"	80 / 3"	100 / 4"
Expl. Gr.	IIA P _{max}	1.6 / 23.2	1.6 / 23.2
	IIB3 P _{max}	1.6 / 23.2	1.5 / 21.7

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	T _{maximum allowable operating temperature in °C}	higher operating temperatures upon request
-	Designation	

Table 5: Material selection for housing

Design	A	B	The housing and cover with the shock absorber can also be delivered in steel with an ECTFE coating.
Housing	Steel	Stainless Steel	
Heating jacket (DR/ES-H-(T)-...)	Steel	Stainless Steel	
Cover with shock absorber	Steel	Stainless Steel	
O-Ring	PTFE	PTFE	
Flame arrester unit	A	B, C, D	

Special materials upon request

Table 6: Material combinations of the flame arrester unit

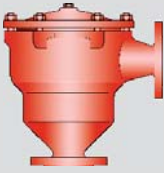
Design	A	B	C	D	* the FLAMEFILTER® are also available in the materials Tantalum, Inconel, Copper, etc. when the listed housing and cage materials are used.
FLAMEFILTER® cage	Steel	Stainless Steel	Stainless Steel	Hastelloy	
FLAMEFILTER® *	Stainless Steel	Stainless Steel	Hastelloy	Hastelloy	
Spacer	Stainless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

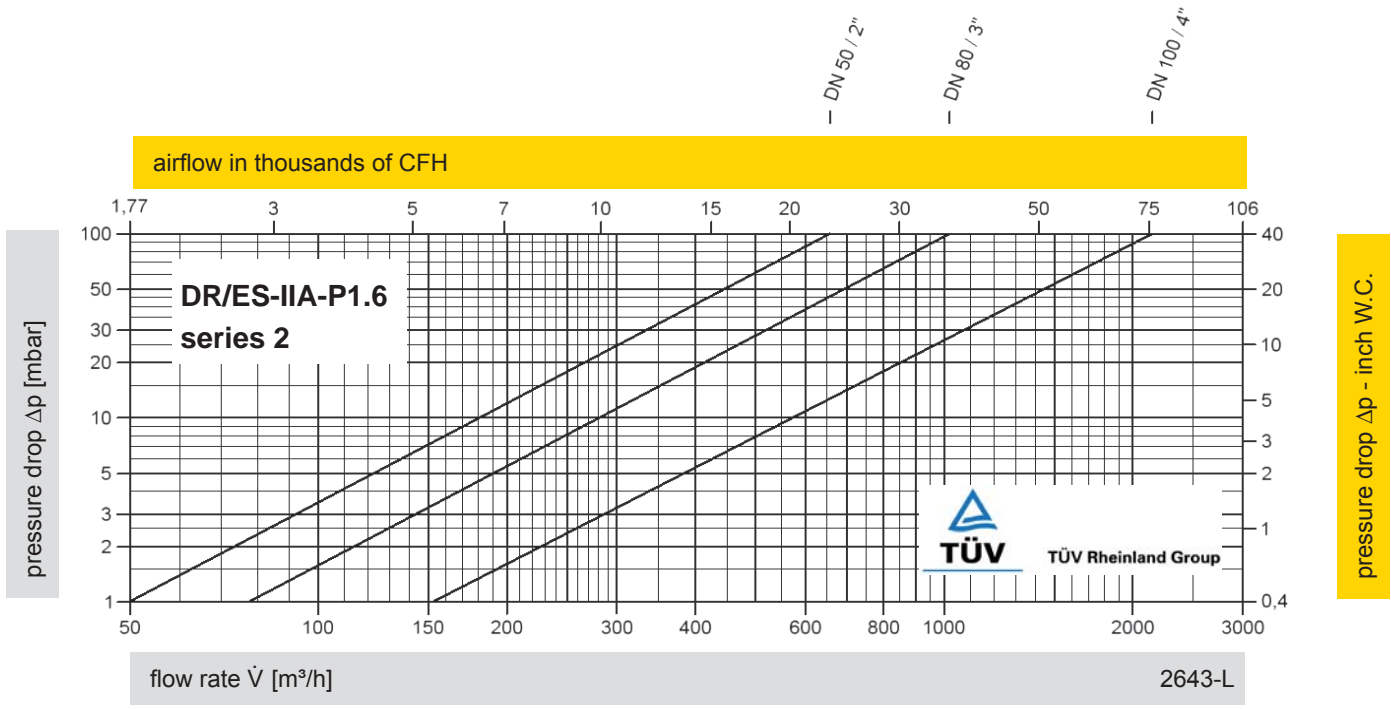
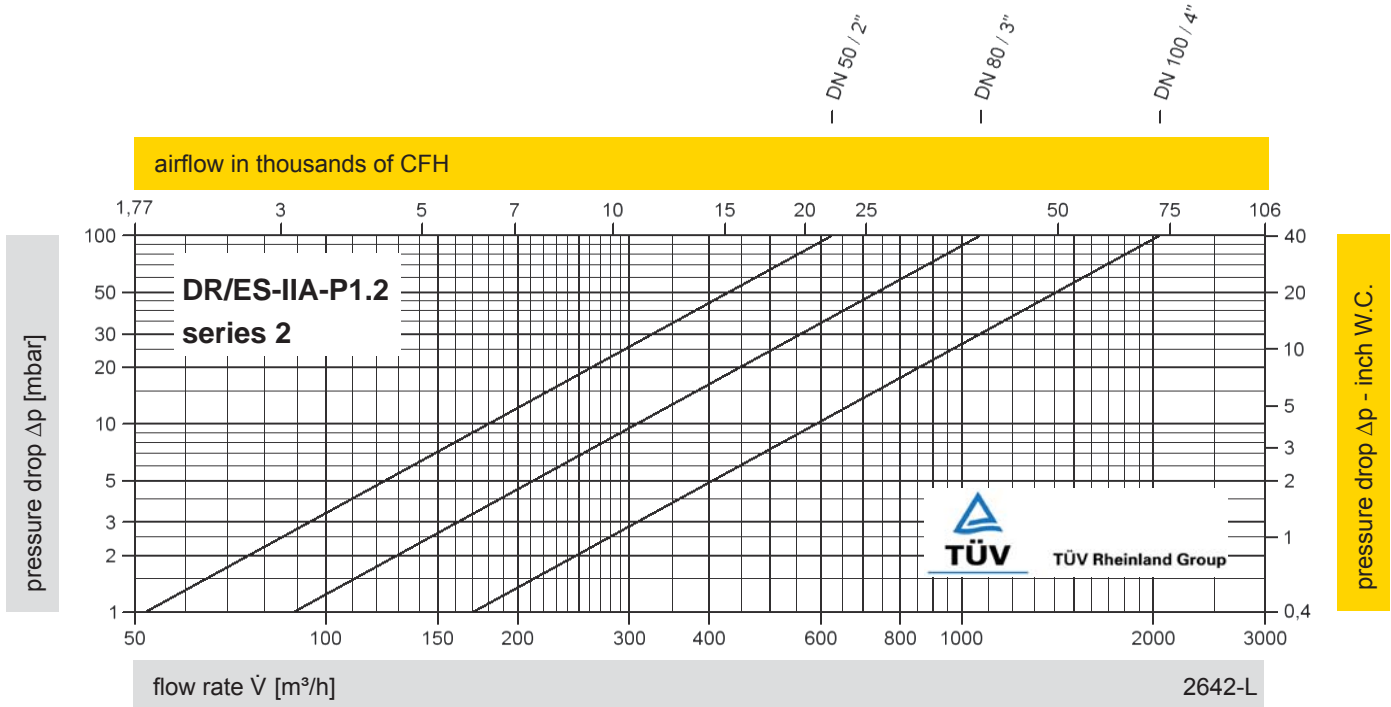




In-Line Detonation Flame Arrester

Flow Capacity Charts

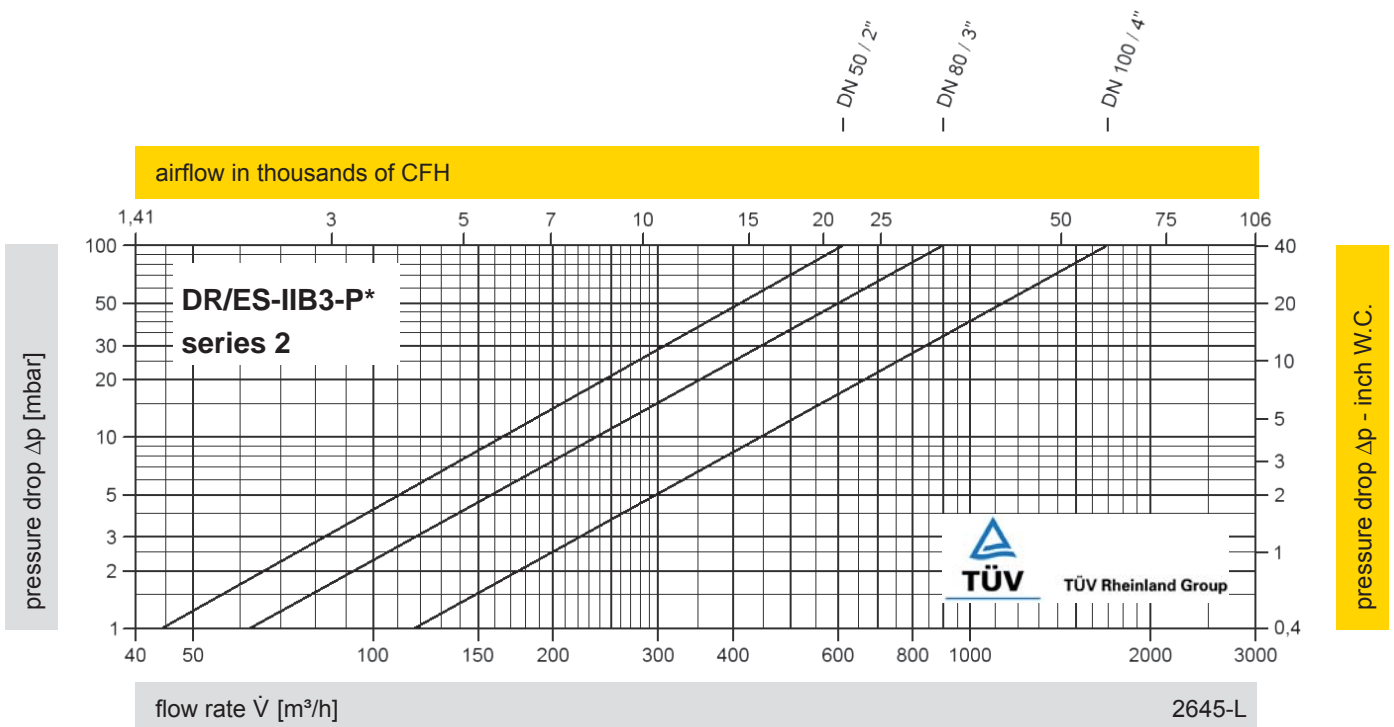
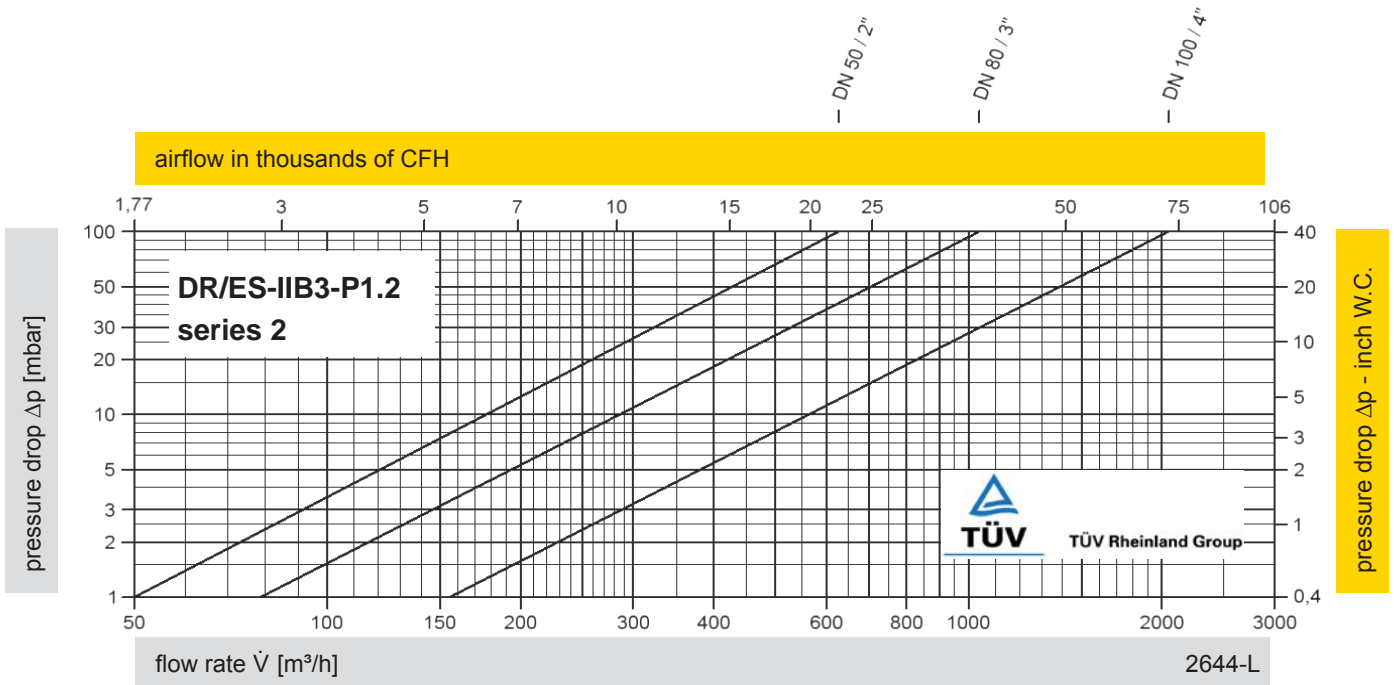
PROTEGO® DR/ES (series 2)



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".

PROTEGO® DR/ES (series 2)



P* see table 3



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