Data Sheet

VENTEX - PASSIVE EXPLOSION ISOLATION VALVE

DESCRIPTION

The risk of an industrial explosion occurs in many stages of production, transportation and storage of combustible dusts and gases. Apart from preventative measures to reduce the explosion risk, appropriate constructive explosion measures will protect against the effects of explosions.

Protective techniques are generally classified into explosion venting, explosion suppression, containment and explosion isolation. The safety function of explosion venting and suppression is to protect process vessels from explosion over-pressurization while explosion isolation will keep explosions from spreading throughout a process.

EXPLOSION ISOLATION: SAFETY FUNCTION

The safety function of explosion isolation is to prevent flame propagation down interconnected pipelines to other process vessels and/or equipment or an unsafe explosion discharge into the workplace. Explosion isolation must be considered for all venting, suppression and containment explosion protection systems. Propagation of the explosion pressure and flame can occur even against the normal direction of process flow. The consequences of not giving full consideration to explosion isolation of interconnected vessels are flame jet ignition and pressure piling.

PASSIVE MECHANICAL EXPLOSION BARRIER

Unlike active explosion barriers, these valves are closed by the force of the explosion pressure wave itself and do not require an external energy supply, detectors or system controls. The valves are designed to close in milliseconds providing a mechanical barrier against flame and pressure.

Type ESI-E Single Acting Explosion Barrier Valve (Fig. 1)
This model consists of a valve body (1) inside which a floating ball (2) attached to the valve stem (3) moves within the valve stem guides (4). The floating ball is kept in the open (central) position by a spring which is set to keep the valve in the open position against a maximum process airflow of 20 m/sec (optional 25m/s) (5).

A minimum pressure differential across the valve of 0.05 bar (0.2 bar for DN600), for instance the flow of an explosion pressure wave (6), will drive the floating ball onto the valve seat (7), creating a barrier to the explosion pressure and flame (8). The floating ball is secured in the closed position by a locking cam (9); lifting the reset knob (10) will return the floating ball to the open position.

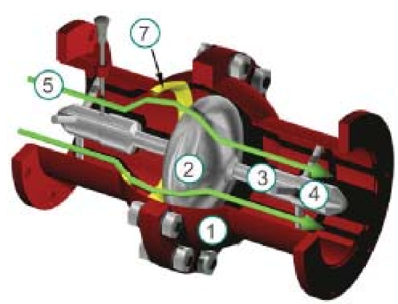

Fig. 1: ESI-E
Valve in open position

Type ESI-D Double Acting Explosion Barrier Valve (Fig. 2)
This model is similar to the ESI - E, but is designed to prevent explosion pressure and flame from passing the valve in either direction. This is accomplished by the floating ball being bi-directional and having two seats. The floating ball is kept in the open position by a spring on either side. A locking cam on both ends of the valve will in the event of an explosion secure the floating ball against one of the seats.

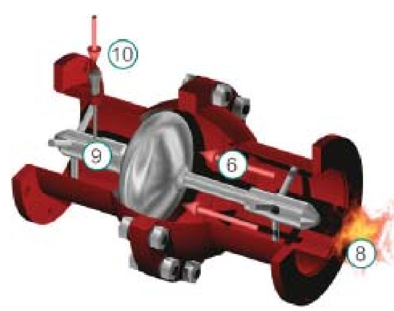

Fig. 2: ESI-D
Valve closed by the explosion pressure wave

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Type ESI-C Explosion Barrier Check Valve (Fig. 3)
The action of the valve spring (4) makes this a normally closed valve. Under process working conditions the process airflow (5) forces the floating ball off its seat opening the valve. In the event of an explosion downstream of the ESI -C, the explosion pressure wave (6), assisted by the valve spring drives the floating ball back against its seat. The combination of the pressure wave and the spring force allow this valve to be positioned closer to the origin of the explosion.

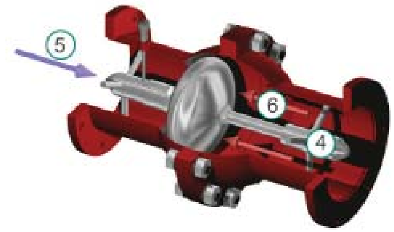


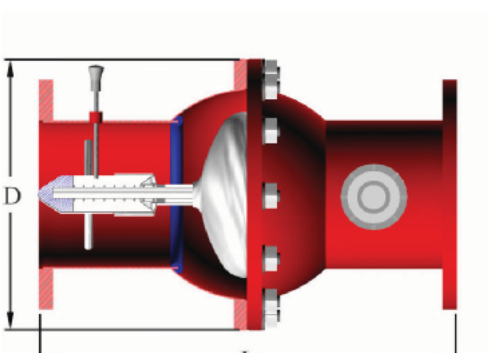
Fig. 3: ESI-C
Normally closed valve

DIMENSIONS FOR VENTEX TYPE ESI-E, ESI-D, and ESI-C

Size		L (mm)	D (mm)	Weight (kg)	ESI-E Pressure Drop (mbar)				ESI-D Pressure Drop (mbar)		ESI-C Pressure Drop (mbar)	
					at 15 m/s		at 20 m/s		at 15 m/s	at 20 m/s	at 15 m/s	at 20 m/s
mm	in				A	B	A	B				
100	4	350 *400	215	30	2.9	3.5	5.0	6.0	2.9	5.0	28	4.3
200	8	610	417	53	1.9	2.3	3.4	4.1	1.9	3.4	4.9	6.8
300	12	780	550	84	1.2	1.8	2.2	3.1	1.2	2.2	3.8	6.1
400	16	940	682	133	2.4	2.7	4.3	4.8	2.4	4.3	6.1	7.8
500	20	1300	814	213	4.7	5.8	8.4	10.5	4.7	8.4	7.3	12.8
600	24	1420	929	305	4.0	.0	7.0	8.8	4.0	7.0	-	-
700	28	1530	1220	460	4.8	4.8	8.5	8.5	4.8	-	-	-

(*) for type ESI-D
A: with explosion flow

DN700 not ATEX approved yet, for special application only
B: against explosion flow



SPECIFICATIONS

Types: ESI-E Single Acting Explosion Isolation Valve
ESI-D Double Acting Explosion Isolation Valve
ESI-C Explosion Isolation Check Vavle with Locking Device

Atex certification E_{0081}EXII 1GD IIB/2GD IIB (Equipment internal/external), EX GD (Protective System)

Nominal Dimension		DN100	DN200	DN300	DN400	DN500	DN600
ATEX certified no. FSA 03 ATEX -		1516X	1517X	1518X	1519X	1520X	1513X
Max K for organic dust	bar/m/s^{-1}	300	300	300	300	300	300
Max K for gas, gas group IIB	bar/m/s^{-1}	100	100	100	100	100	100
Min required explosion pressure (*)	barg	0.05	0.05	0.05	0.05	0.05	0.20
Max explosion pressure (20°C)[2]	barg	14	14	14	14	14	13
Min installation distance gas/dus (K+100/300 bar/m/s^{-1})	m	3	3	3	3	3	5
Max installation distance dust (K=300 bar/m/s^{-1})	m	12	12	12	12	12	12
Max installation distance gas (K=300 bar/m/s^{-1})	m	8	8	8	8	8	8
Max K for hybrid mixtures	bar/m/s^{-1}	400	400	400	400	400	300
Min installation distance hybrid mixtures	m	3	3	3	4	3	5
Max installation distance hybrid mixtures	m	5	5	5	6	3	8
Max K for metallic dust	bar/m/s^{-1}	400	450	450	-	-	-
Min installation distance metallic dust (Alu)	m	3	4	4	-	-	-
Max installation distance metallic dust (Alu)	m	3.5	5	5	-	-	-
Max air velocity	m/s	20	20	20	20	20	25
Max air velocity (optional)	m/s	25	25	25	(25)[1]	-	-

(*) refer to application guide selection

Maximum Operating Temperature: FSA, Mannheim
Neoprene Gaskets: T_{max} 90°C at higher operating
EPMD Gaskets: T_{max} 120°C temperature than
Silicone Gaskets: T_{max} 150°C 90°C the maximum
FPM Gaskets: T_{max} 150°C allowable explosion
High Temperature Gaskets: T_{max} 260°Cm nax oressyre us reduced at T>90°C

Maximum Flow Velocity: Vmax = 20 m/s, optional 25 m/s, Ventex-ESI-E against expl. direction max=35m/s

Min. Installation Distance X_{min}: 3-5 meters from explosion source (depending on DN and medium)

Max. installation Distance X_{max} 3-12 meters from explosion source (depending on DN and medium)

Material Specification: *Type A:* mild steel painted red (Nitro-synthetic resin top coat RAL 3020) valve body; AISI 304 (W1.4301) internal part. Wetted parts: mild steel/AISI 304
Type B: AISI 304 (W1.4301) valve body; AISI 304 (W1.4301) internal parts. Wetted parts: AISI 304
Type E: AISI 316 L (W1.4435) valve body and internal parts. Wetted parts: AISI 316

L Flanges: DIN 2576, PN 10; ANSI 150

Leakage: Standard valves are not gas-tight to the outside, -C gas-tight 2 bar

Options: Position indicators (valve open/valve closed), also available for use in Ex classified areas; higher process temperatures; vertical installation; other surface treatment; mating flanges, gaskets, studs and nuts; ANSI flanges #150; Gas-tight (DIN 3230 BO L1) up to 2 or 10 bar

Form No. X.1.24.01 September, 2006 Specifications are subject to change without notice.