DATA SHEET

VENTEX (ESI TYPE 6) – 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 overpressurization, while explosion isolation will keep explosions from spreading throughout a process.

APPROVALS:

- EAC

EXPLOSION ISOLATION: SAFETY FUNCTION

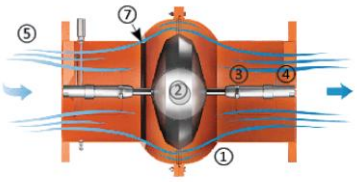
The safety function of explosion isolation is to prevent flame propagation through interconnected pipelines to other process vessels and/or equipment or an unsafe explosion discharge into the workplace. Explosion isolation must be considered for all venting, suppression and containment explosion protection 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 ISOLATION BARRIER

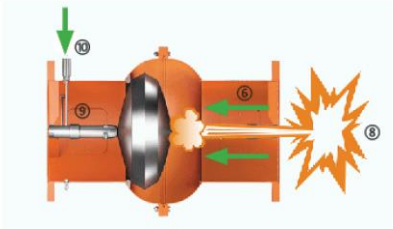
Unlike active explosion barriers, passive float valves are closed by the force of the explosion pressure wave itself and do not require an external energy supply, detectors or system controls. The valves are designed to close within milliseconds providing a mechanical barrier against flame and pressure.

TYPE ESI-E SINGLE ACTING EXPLOSION BARRIER VALVE (FIG. 1 & 2)

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/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.

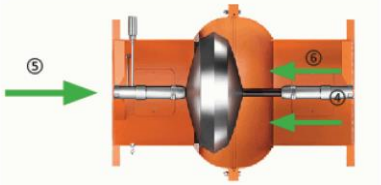


TYPE ESI-D DOUBLE ACTING EXPLOSION BARRIER VALVE

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.

TYPE ESI-C EXPLOSION BARRIER CHECK VALVE (FIG. 3)

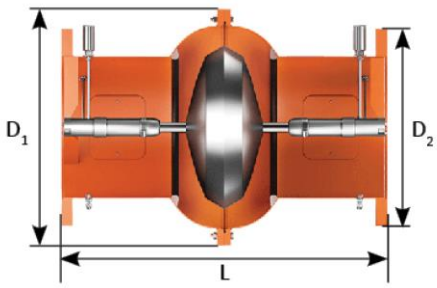
The action of the valve spring ④ makes this a normally closed valve. Under process working conditions the process airflow ⑤ forces the floating ball off its seat opening the valve. In the event of an explosion downstream of the ESI – C, the explosion pressure wave ⑥, assisted by the valve spring drives 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.



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

Size	L (mm)	D_1 (mm)	D_2 (mm)	Weight (kg)
DN100	350 400 [1]	215	220	30
DN150	500	315	285	35
DN200	610	417	340	53
DN300	780	550	445	84
DN400	940	682	565	133
DN500	1300	814	670	213
DN600	1420	929	780	305

(1) for type ESI-D.



EXPLOSION PRESSURE VENTEX TYPE ESI-E, ESI-D & ESI-C (AT 22°C)

Size		DN100		DN150		DN200		DN300		DN400		DN500		DN600
Max. Air Speed	m/s	20	25	20	25	20	25	20	25	20	25	20	25	25
Explosion Pressure	Min. barg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.12	0.05	0.06	0.2
	Max. barg	14	14	14	14	14	14	14	14	14	14	14	14	13

PRESSURE DROP FOR HORIZONTAL INSTALLATION FOR VENTEX TYPE ESI-E, ESI-D & ESI-C

Size	ESI-E				ESI-D		ESI-C	
	Pressure Drop (mbar)				Pressure Drop (mbar)		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
	A [1]	B [2]	A [1]	B [2]				
DN100	4.25	6.90	7.55	12.23	4.25	7.55	6.90	12.23
DN150	4.31	5.59	8.77	9.89	4.31	8.77	5.59	9.89
DN200	2.32	3.73	3.85	6.47	2.32	3.85	3.73	6.47
DN300	2.48	3.74	4.43	6.49	2.48	4.43	3.68	6.26
DN400	4.20	5.56	8.15	9.58	4.56	7.73	5.40	8.17
DN500	4.49	5.44	8.41	9.77	4.36	8.04	5.44	9.77
DN600	4.26	5.44	7.57	9.51	4.26	7.57	5.49	9.54

(1) A: with explosion
(2) B: against explosion flow

PRESSURE DROP FOR VERTICAL INSTALLATION FOR VENTEX TYPE ESI-E, ESI-D & ESI-C

Size	ESI-E				ESI-D				ESI-C			
	Pressure Drop (mbar)				Pressure Drop (mbar)				Pressure Drop (mbar)			
	Explosion from top		Explosion from bottom		Explosion from top		Explosion from bottom		Explosion from top		Explosion from bottom	
	at 15 m/s	at 20 m/s	at 15 m/s	at 20 m/s	at 15 m/s	at 20 m/s	at 15 m/s	at 20 m/s	at 15 m/s	at 20 m/s	at 15 m/s	at 20 m/s
DN100	1.89	4.25	1.90	4.54	1.89	4.25	1.90	4.54	6.90	12.23	6.90	12.23
DN150	1.57	4.31	1.57	4.31	1.57	4.31	1.57	4.31	5.59	9.89	5.59	9.89
DN200	1.03	3.25	1.14	2.32	1.03	3.25	1.14	2.32	3.73	6.47	3.73	6.47
DN300	1.55	3.39	1.22	3.07	1.84	3.80	1.16	3.01	6.04	7.57	4.73	7.09
DN400	2.06	4.63	1.65	4.20	2.06	4.63	1.65	4.20	5.56	9.58	5.56	9.58
DN500	1.85	4.49	2.29	5.28	1.85	4.49	2.29	5.28	5.44	9.77	5.44	9.77
DN600	1.89	4.26	1.89	4.26	1.89	4.26	1.89	4.26	5.44	9.51	5.44	9.51

SPECIFICATIONS

Revision	Ventex Type 6 – Improved maintenance feature over type 5			
Types	ESI-E Single Acting Explosion Isolation Valve ESI-D Double Acting Explosion Isolation Valve ESI-C Explosion Isolation Check Valve with locking device			
Explosion Hazard	K_{st} (Dust hazard) ≤ 400 bar.m/s K_G (Gas hazard) ≤ 100 bar.m/s K_H (Hybrid) ≤ 400 bar.m/s K_{st} (Metallic dust) ≤ 400 (DN100), 450 (DN150-300), DN400 not certified, 300 (DN500-600)			
P_{EX} at 20°C	DN100-500 13 barg maximum DN600 12 barg maximum			
In combination with venting	p_{stat} ≥ 0.100 bar (0.200 for DN600)			
In combination with suppression	P_{act} ≥ 0.100 bar (0.200 for DN600)			
Explosion tested at	FSA, Mannheim			
ATEX certification	II 1GD II B / 2GD II B GD IIB DN100 - FSA 12 Atex 1622 X DN150 - FSA 12 Atex 1623 X DN200 - FSA 12 Atex 1624 X DN300 - FSA 12 Atex 1625 X DN400 - FSA 12 Atex 1626 X DN500 - FSA 12 Atex 1627 X DN600 - FSA 14 Atex 1646 X			
Maximum Operating Temperature	EPDM Gaskets (FDA) T_{max} 120°C Silicone Gaskets (FDA) T_{max} 150°C High Temperature Silicone Gaskets T_{max} 250°C			
Minimum Ambient / Operating Temperature	+5°C (-20°C optional, no icing allowed)			
Maximum Flow Velocity	V_{max} = 20 m/s, optional 25 m/s			
Dust Load	Dust / Air Concentration ≤ 50 g/m³ Min. Flow Velocity ≥ 12 m/s Particle Size ≤ 0.5 mm Dry Air No condensation allowed			
Material Specification	Type	A	C	E
	Housing	Mild steel painted (orange)	1.4301 (304)	1.4435 (316L)
	Internal and wetted parts	1.4301 (304)	1.4301 (304)	1.4435 (316L)
Flanges	DIN 2576, PN10			
Leakage	Standard valves are not gastight, type ESI-C gastight 2 bar			
Position Indicators (valve open / valve closed) [1]	Namur or Inductive			

Options	High process temperatures Vertical installation Other surface treatment Mating flanges, gaskets, studs and nuts ANSI flanges Gastight (DIN 3230 BO L1) up to 2 or 10 bar

(1) Also available for use in Ex classified areas.