

EXPLOSION ISOLATION, DUAL-FLAP ISOLATION (DFI™) VALVE

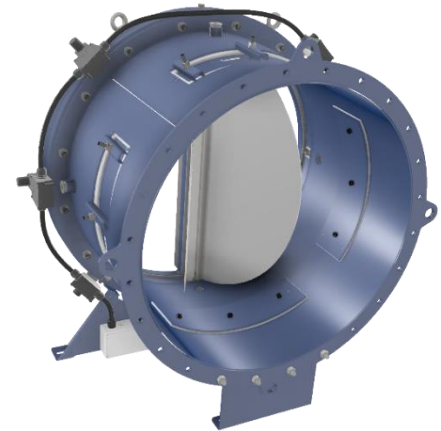
ATEX -  II D, and UKEX –  0168 approved

The DFI valve is a flow-actuated (passive) flap valve designed to halt dust explosions that propagate opposite the normal process airflow. During normal operation, the valve flaps are held open by the process airflow. Should a deflagration occur, the pressure wave created will cause the valve flaps to close automatically and lock the flaps in place, preventing the deflagration flame front from propagating past the valve to upstream equipment.

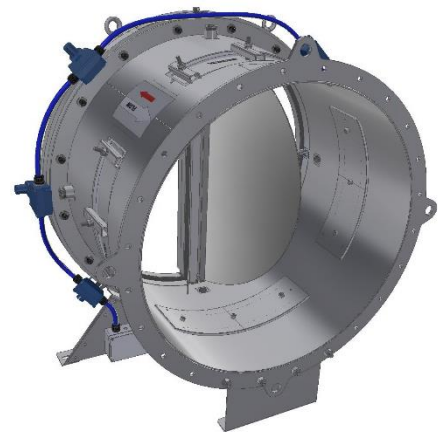
The DFI valve consists of a heavy-duty steel cylindrical valve body, removable inspection hatches, dual isolation flaps, and latching mechanisms designed to firmly hold the flaps in the closed position to prevent the valve flaps from re-opening should a deflagration occur. An integral Locked Position Indicator circuit monitors the latching mechanisms to initiate the automatic shutdown of the protected process.

The DFI valve mounts on the inlet conveying duct of a protected vessel using counter flanges welded to the process line. The required counter flanges and mounting hardware can be ordered with the valve or separately as a kit (see Ordering).

A field junction box is provided on the DFI valve flange stand to facilitate the field connection of the wiring for the valve's Locked Position Indicator (LPI) circuit and the optional Dust Layer Accumulation (DLA) sensor to the facility's Programmable Logic Controller (PLC). The LPI and DLA circuits can connect directly to a facility's PLC if NAMUR compatible and intrinsically safe. If the PLC is not NAMUR compatible and intrinsically safe, a Fike intrinsic safety barrier (ISB) or Valve Interface Module must be installed to facilitate the connection to the PLC.





DFI – Coated Carbon Steel;
DN100-1000



DFI – Stainless Steel;
DN100-800

SPECIFICATIONS

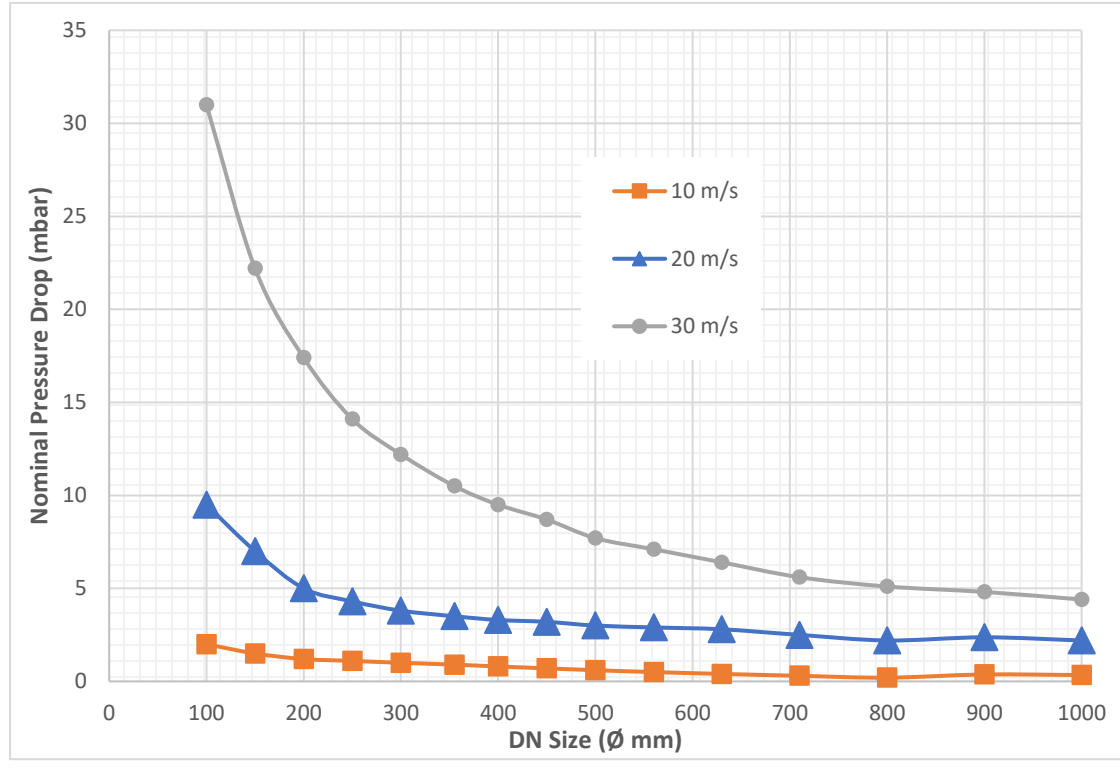
DUAL-FLAP ISOLATION VALVE			
VALVE MATERIAL OPTION	Carbon Steel	Stainless Steel	Carbon Steel
SIZE	DN100 – DN800 (4" – 32")		DN900 – DN1000 (36" – 40")
FUEL TYPE	Organic and metal dusts, including light metal dusts such as Aluminum		Organic dusts only
CERTIFICATIONS	ATEX -  II D, and UKEX –  0168 approved, according to EN 16447 (ATEX) and BSI 2016 No. 1107 (UKEX)		
FUEL MIE / MIT LIMITS ^[1]	MIE ≥ 1.4 mJ / 380°C MIT	MIE ≥ 1.4 mJ / 400°C MIT	
INSTALLATION DIRECTION	Horizontal / *Vertical (flaps down); refer to E06-162/P13333 for installation instructions. *Vertical installation available on DN600 and below.		
PROCESS CONNECTION	DIN 24154-R11 flanges		
OPERATING PRESSURE	±0.5 bar (± 7.3 PSIG); approved for PUSH or PULL systems		
MAXIMUM EXPERIMENTAL SAFETY GAP ^[1]	≥ 1.23 mm MESG		
MAX DUST LOAD	Product loading larger than 1 kg/m ³ requires factory review.		
PROCESS FLOW VELOCITY	≤ 40 m/s		

^[1] Minimum ignition temperature of the dust cloud according to ASTM E 1491, EN 80079-20-2 or VDI 2263, Blatt 1, 2.6. DFI has been tested with several dust fuels. The fuel with the lowest MIE was an MIE of 1.4 mJ. The MIE was measured with inductance (L=1mH). The fuel with the lowest MIT was an MIT of 380°C. DFI application is not limited by MIE of MIT, but by MESG, which is calculated in function of MIE and MIT for the same dust as follows:

$$\text{MESG (mm)} = 1.01 * (\text{MIE(mJ)}) * (\text{MIT(°C)} + 273) / 273^{0.157}$$

PRESSURE DROP ^[2] (as a function of DN size and average process velocity)

**DN100-1000
[4-40]**



MATERIALS OF CONSTRUCTION

Valve	DN100-DN800 Carbon Steel	DN100-DN800 Stainless Steel	DN900 and DN1000 Carbon Steel Only
Body	Coated Carbon Steel 1.0044 (A1011)	Stainless Steel, 1.4401/1.4404 (316/316L SST)	Coated Carbon Steel 1.0044 (A1011)
Wetted Parts	1.4548 (17-4 PH SST) – Flaps and Hardware 3.2315 (6061-T6 Aluminum) – Latch Components 1.4401/1.4404 (316/316L SST) – Center Support/Guard CW307G (Bronze 642) - Bushings		
	Zinc Plated Alloy Steel – Flap Hardware EPDM/Silicone – Gaskets (Silicone option replaces EPDM)	1.4980 (A286 SST) – Flap Hardware EPDM/Silicone – Gaskets (Silicone option replaces EPDM)	Zinc Yellow-Chromate Plated Steel – Flap Hardware Silicone - Gaskets

^[2] Pressure drop data is based on clean air steady-state CFD analysis where the DFI size equals the nominal process pipeline diameter. Pressure drop can be reduced by installing a larger DFI size via conical transition spools. Consult the factory for pressure drops of the non-standard valve to pipeline size combinations via expansion or contraction spools.

TEMPERATURE RANGE ^{[3][4]}

Seal Material	EPDM	Silicone
Seal Approvals	FDA 21 CFR 177.2600 - INDIRECT FOOD ADDITIVES: POLYMERS	
Operating	-20°C – 120°C (-4°F – 248°F)	-20°C to 150°C (-4°F to 302°F)
Ambient	-40°C – 70°C (-40°F – 160°F)	

^[3] Temperature limits are provided for the base valve. See optional component limits.

^[4] Temperature limits are based on mechanical and electrical properties. The DFI functionality cannot be guaranteed in conditions where ice is allowed to form on the interior of the valve. To reduce heat loss or risk of ice formation at low temperatures, the valve's exterior can be insulated or heat traced without the risk of restricting the movement of the flaps or latching mechanisms. When applying heat trace or insulation, locate it in contact with the DFI body and flanges but under the LPI switch box conduit so as not to stress the LPI switch wiring or LPI switch box structure.

INTEGRAL LOCK POSITION INDICATOR CIRCUIT

HAZARDOUS RATINGS	Designated by Fike as a simple apparatus in accordance with the ATEX product directive 2014/34/EU ^[5]
MAXIMUM SWITCHING VOLTAGE	175 Vdc
NOMINAL SWITCHING VOLTAGE	8.2 Vdc
MAXIMUM SWITCHING CURRENT	0.25 A dc
TYPICAL RESISTANCE	0.2 Ω
AMBIENT TEMPERATURE	-40°C to 105°C (-40°F to 221°F)
WIRING	Two conductors, 24 AWG 7/32 PVC cable 105°C, 1000 mm, tinned leads

^[5] If the DFI valve is installed in a hazardous area, an intrinsic safety barrier (ISB) or the Fike Valve Interface Module must be installed to facilitate the connection of the valve's LPI circuit and the optional Dust Layer Accumulation (DLA) sensor to the facility's PLC, unless a NAMUR compatible intrinsically safe PLC is used. The ISB or intrinsically safe PLC ratings determine which hazardous areas the DFI valve can be installed into. When installed in an ATEX-zoned area, indicators can only be applied in circuits of type protection "I" per ATEX product directive 2014/34/EU, Article 1, paragraph (2) and EN 60079-11:2012, clause 5.7.

VALVE EXPLOSION HAZARD APPLICATION RATINGS

Nominal Size Range	Valve Material	Fuel Limits		Application Limits		Valve Limits		
		Kst	P _{MAX}	Minimum Volume	PRED, MAX	Minimum Installation Distance (X _{min})	Maximum Installation Distance ^[1] (X _{max})	Explosion Pressure Resistance of DFI Valve
DN [in]		bar-m/s	bar	m ³	bar-g	ft [m] [1]	ft [m]	bar-g
100 [4]	Carbon Steel	479	10	0.34	1.39	5.58 [1.70]	42 [12.80]	6.07
	Stainless Steel	389	10	0.34	0.92	5.58 [1.70]	42 [12.80]	5.49
150-400 [6-16]	Carbon Steel	479	10	0.34	1.39	5.58 [1.70]	42 [12.80]	4.61
	Stainless Steel	389	10	0.34	0.92	5.58 [1.70]	42 [12.80]	4.17
450-600 [18-24]	Carbon Steel	479	10	1.26	0.71	9 [2.74]	60 [18.29]	2.05
					0.97		20 [6.10]	
	Stainless Steel	389	10	1.26	0.47	9 [2.74]	60 [18.29]	1.86
					0.64		20 [6.10]	
630-800 [25-32]	Carbon Steel	389	10	5.11	0.71	9 [2.74]	20 [6.10]	0.85
		479	10		0.48			
	Stainless Steel	389	10	5.11	0.47	9 [2.74]	20 [6.10]	0.77
900-1000 [36-40]	Carbon Steel	389	8.1	10.2	.523	10 [3.05]	20 [6.10]	0.790

^[1] Installation distance is measured along the centerline of the pipe, from the face of the DFI outlet spool to the point where the pipe centerline intersects the vessel wall. If the volume of the vessel was calculated at a point other than the vessel wall, where the centerline meets the calculated volume shall be considered the installation distance.

OPTIONS

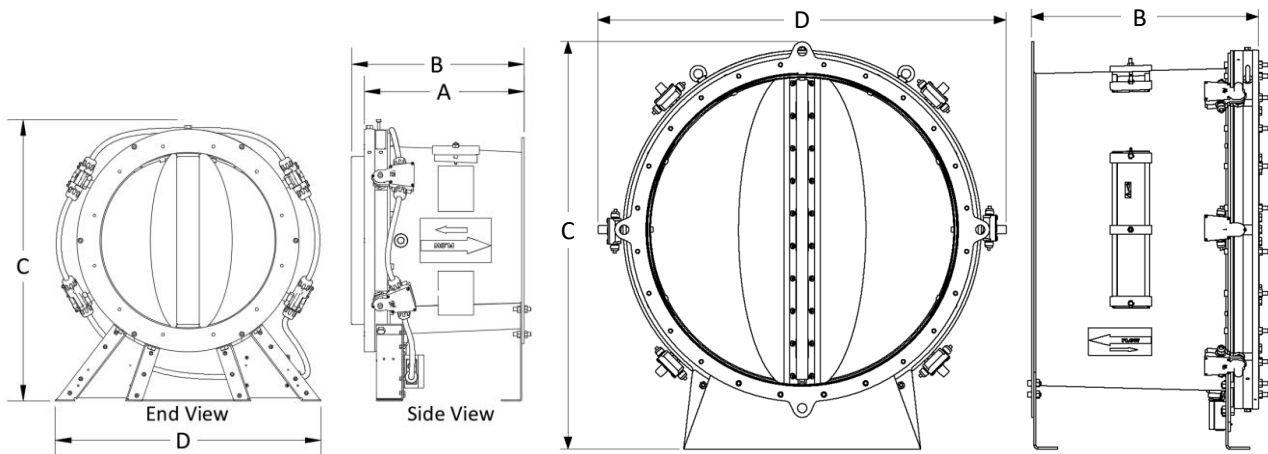
The following optional components are ordered separately and can be added to the DFI valve to increase the operational reliability of the valve and to provide local monitoring of the valve.

FLANGE INSTALL KIT	Includes EPDM or Silicone gaskets, counter flanges (CS or SST), and mounting hardware required to install valve onto pipeline, if not procured elsewhere. See Ordering.
AIR-PULSE CLEANING VALVE (APCV)^[1]	Attach to the valve and use house air to mitigate the accumulation of media on the flap gasket. Refer to data sheet X.1.105.01.
DUST LAYER ACCUMULATION (DLA) SENSOR	Attach to the valve to warn of accumulation of media within the valve body. Mandatory per NFPA 69. Requires use of an Intrinsic Safety Barrier (ISB) or Intrinsically Safe PLC if the DFI is installed in a hazardous area. Refer to data sheet X.1.106.01.
VALVE INTERFACE MODULE	Provide a visual indication of the status of the DFI valve, optional air-pulse timing circuit for control of the APCV (when installed), Intrinsic Safety Barrier ^[2] to facilitate the connection of the valve's LPI and DLA circuits to the facility's PLC if the valve is installed in a hazardous area. Refer to data sheet X.1.104.01.
INTRINSIC SAFETY BARRIER (ISB)^[2]	Facilitate the connection of the valve's LPI and DLA circuits to the facility's PLC if the DFI valve is installed in a hazardous area. It is not required if the Valve Interface Module is installed or an intrinsically safe PLC is used. Refer to the ISB manufacturer's website for hazardous area approvals.

^[1] If no operational history is available, Fike recommends installing the Air-Pulse Cleaning Valve (APCV) to the DFI valve if the dust concentration in the dust aspiration line exceeds 70 g/m³ during normal operation unless proven otherwise by actual operational history.

^[2] Phoenix Contact Safety Barrier, model MACX MCR-EX-SL-2NAM-R-UP.

DIMENSIONS



DN100-800 (LEFT), DN900-DN1000 (RIGHT)

Nominal Size DN [in]	DIMENSIONS in mm [in]				BOLTS			MASS KG [lbs]
	A	B	C	D	SIZE	QTY	TORQUE Nm [ft-lb]	
100 [4]	255.3 [10.05]	272.1 [10.71]	348.4 [13.72]	385.1 [15.16]	M8	4	20 [15]	20.4 [45]
150 [6]	280.2 [11.03]	297.0 [11.69]	397.2 [15.64]	444.1 [17.48]	M10	8	40 [30]	29.5 [65]
200 [8]	305.5 [12.03]	322.4 [12.69]	464.4 [18.28]	475.2 [18.71]	M10	8	40 [30]	38.6 [85]
250 [10]	330.2 [13.00]	347.1 [13.66]	509.4 [20.05]	505.7 [19.91]	M10	8	40 [30]	45.4 [100]
300 [12]	355.4 [13.99]	372.3 [14.66]	545.6 [21.48]	522.7 [20.58]	M10	8	40 [30]	59.0 [130]
355 [14]	382.9 [15.08]	399.8 [15.74]	607.7 [23.93]	575.5 [22.66]	M10	8	40 [30]	68.0 [150]
400 [16]	405.1 [15.95]	422.0 [16.61]	708.2 [27.88]	719.3 [28.32]	M10	12	40 [30]	81.6 [180]
450 [18]	430.4 [16.94]	466.3 [18.36]	752.5 [29.63]	726.3 [28.59]	M10	12	40 [30]	99.8 [220]
500 [20]	455.3 [17.93]	491.3 [19.34]	797.9 [31.41]	755.3 [29.73]	M10	12	40 [30]	108.9 [240]
560 [22]	485.3 [19.11]	521.3 [20.52]	859.6 [33.84]	803.9 [31.65]	M12	16	40 [30]	136.1 [300]
600 [24]	505.1 [19.89]	541.0 [21.30]	896.5 [35.29]	828.9 [32.63]	M12	16	40 [30]	147.4 [325]
630 [25]	521.0 [20.51]	556.9 [21.93]	922.5 [36.32]	846.5 [33.33]	M12	16	40 [30]	156.5 [345]
710 [28]	560.3 [22.06]	596.2 [23.47]	994.2 [39.14]	895.3 [35.25]	M12	16	40 [30]	176.9 [390]
800 [32]	605.1 [23.82]	641.0 [25.24]	1074.9 [42.32]	948.9 [37.36]	M12	24	40 [30]	201.8 [445]
900 [36]	-	676.3 [26.63]	1201.6 [53.67]	1203.4 [47.38]	M12	24	40 [30]	307.5 [678]
1000 [40]	-	726.4 [28.60]	1306.6 [51.44]	1311.9 [51.65]	M12	24	40 [30]	376.0 [829]

All sizes conform to NFPA 69 and EN 16447All and utilize DN 24152-R2, T2 flanges for process mounting.

X.1.103.01 Rev D

ORDERING

PART NUMBER	DESCRIPTION									
E30-056-XXXX-X(-X)	Dual-Flap Isolation Valve Assembly									
-XXXX (VALVE SIZE)	0100	0200	0300	0400	0500	0600	0710	0900		
	0150	0250	0355	0450	0560	0630	0800	1000		
-X (MATERIAL / COATING)	CS = Carbon Steel, ISO 12944 C3 coating ^[3] C5M = Carbon Steel, ISO 12944 C5 Marine coating ^[3] SST = Stainless Steel (SST) *Available up to DN800 only									
-X (WETTED SEALS)	NO ADDITIONAL SUFFIX = EPDM Gaskets *Available up to DN800 only SILC = Silicone Gaskets									
OPTIONAL COMPONENTS										
E30-066-XXXX-X-X	Counter Flange Install Kit^[1]									
	-XXXX (VALVE SIZE)	0100	0200	0300	0400	0500	0600	0710	0900	
		0150	0250	0355	0450	0560	0630	0800	1000	
-X (MATERIAL)	1 = Carbon Steel (CS) Flanges 2 = Stainless Steel (SST) Flanges									
-X (GASKET MATERIAL)	NO ADDITIONAL SUFFIX = EPDM Gaskets *Available up to DN800 only SILC = Silicone Gaskets									
02-15293	Dual-Channel Intrinsic Safety Barrier^[2]									

^[1] The kit includes companion mounting flanges, gaskets, and stainless steel mounting hardware.

^[2] If the DFI valve is installed in a hazardous area, an intrinsic safety barrier (ISB) must be used to connect the valve's LPI circuit and optional Dust Layer Accumulation (DLA) sensor to the facility's PLC unless a Valve Interface Module is installed or a NAMUR compatible intrinsically safe PLC is used. Refer to the ISB manufacturer's website for the hazardous area ratings (i.e., Phoenix Contact Safety Barrier, model MACX MCR-EX-SL-2NAM-R-UP).

^[3] All coated CS parts use the color code RAL 5023

Examples:

E30-056-0400-CS = DN400 valve with ISO 12944 C3 coating and EPDM seals on wetted components

E30-056-1000-CS-SILC = DN1000 valve with ISO 12944 C3 coating and Silicone seals on wetted components

E30-056-0150-SST-SILC = DN150 valve with Stainless Steel material and Silicone seals on wetted components

E30-066-0400-1 = Optional DN400 CS flange install kit with EPDM process gaskets

E30-066-0800-2-SILC = Optional DN800 Stainless Steel install kit with Silicone process gaskets