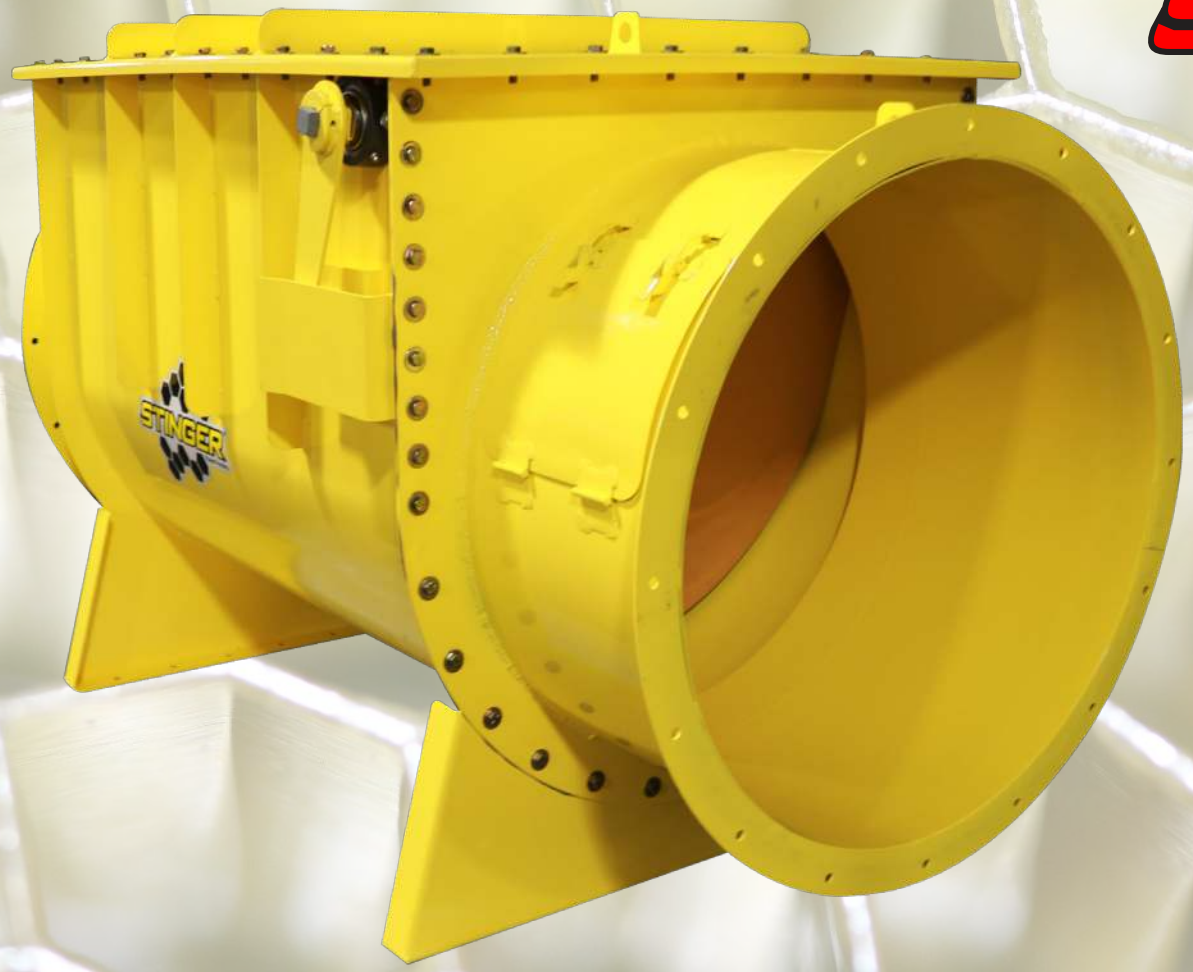
camfil
AIR POLLUTION CONTROL

EXPLOSION ISOLATION VALVES



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CONTENTS

FLOW ACTIVATED **FLAP VALVE**

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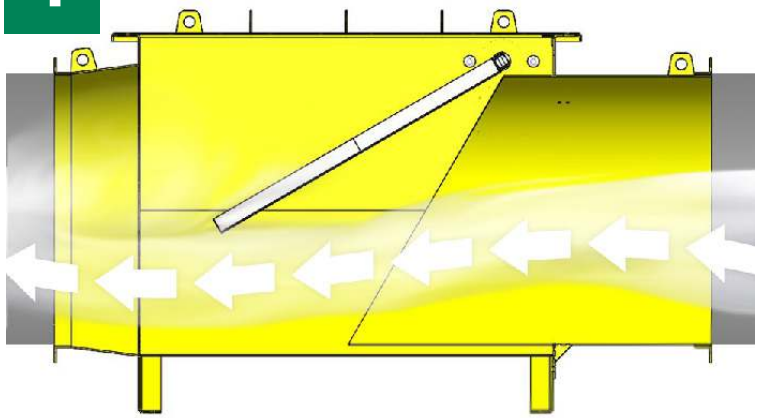
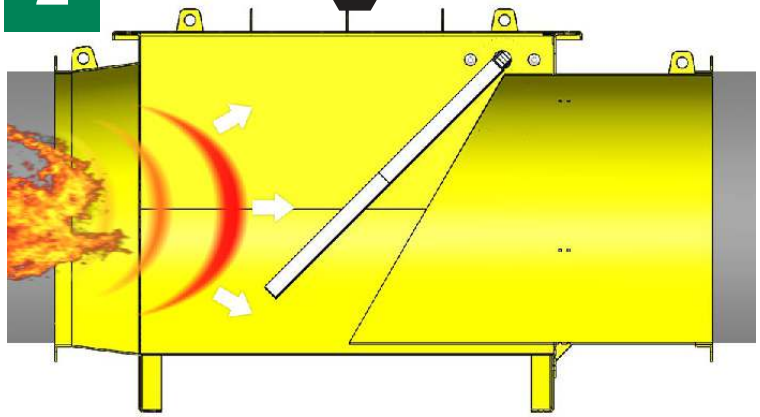
1



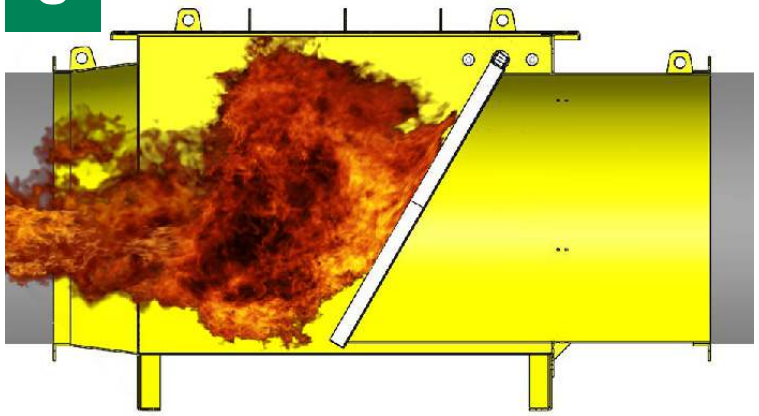
During normal operation, the airflow holds the blade open and a back stop makes sure the blade is in the position that was tested and approved.

2



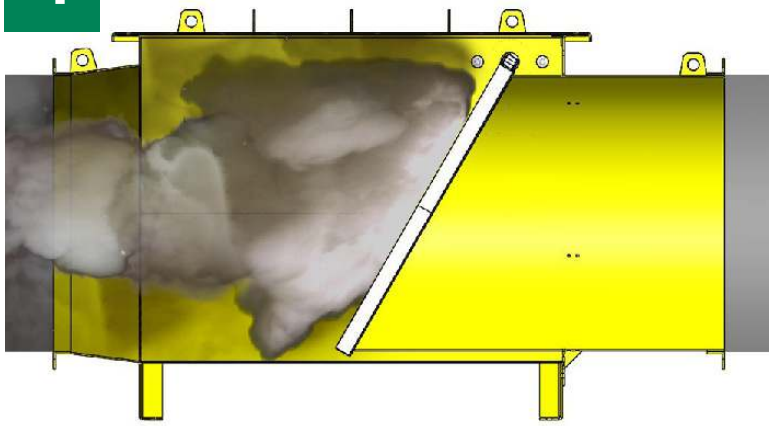
If a deflagration occurs in the dust collector, a pressure wave will travel through the pipe faster than the flame front and close the flap valve.

3



When the valve is fully closed, a latching mechanism keeps it shut. The closed valve prevents the transmission of flame past the valve.

4



The valve also prevents smoke, dust and burning debris from traveling through the inlet pipe into the factory.

NFPA COMPLIANT

Combustible Dust Collection Systems

Inlet Protection

Fast-Acting Valve

Designed to close within milliseconds of detecting an explosion, the fast-acting valve installs in either inlet and/or outlet ducting. The fast-acting valve creates a mechanical barrier within the ducting, which effectively isolates pressure and flame fronts (from either direction) from being able to propagate further through the process.

OR

Inlet/Outlet Chemical Isolation

Designed to react within milliseconds of detecting an explosion, a chemical isolation system can be installed in either inlet and/or outlet ducting. The chemical isolation system creates a chemical barrier that suppresses the explosion within the ducting, reduces the propagation of flame through the ducting and minimizes pressure increases within connected process equipment.

OR

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The purpose of the Stinger is to prevent a deflagration (explosion) that could occur in the dust collector from traveling back down the inlet pipe back into the workspace/process.

Detect and Suppress

These systems protect the dust collector from ignition sources such as sparks or embers. It detects them and activates a spark/ember extinguishing system that extinguishes them before they reach the collector.

Outlet Protection

Integrated Safety Monitoring Filter (Patent Pending)

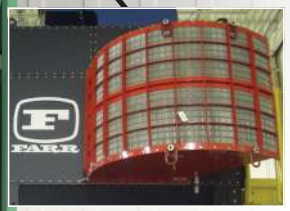
The iSMF has been proven to isolate the downstream equipment from the progression of a flame front during an explosion. The Farr Gold Series dust collector with an integrated Safety Monitoring Filter allows you to recirculate exhaust air back into the work space when your dust is explosive. The key advantage of this device is that it prevents the transmission of explosive dust (fuel) from the collector.

Explosion Venting

Explosion Vent

Designed to be the "weak" link of the vessel, explosion vents open when predetermined pressures are reached inside the dust collector allowing the overpressure and flame fronts to exit to a safe area. Explosion vents minimize damage to the dust collector caused by overpressure created by a deflagration. Camfil APC's standard explosion vents are ATEX certified and NFPA compliant.

OR



Flameless Vent

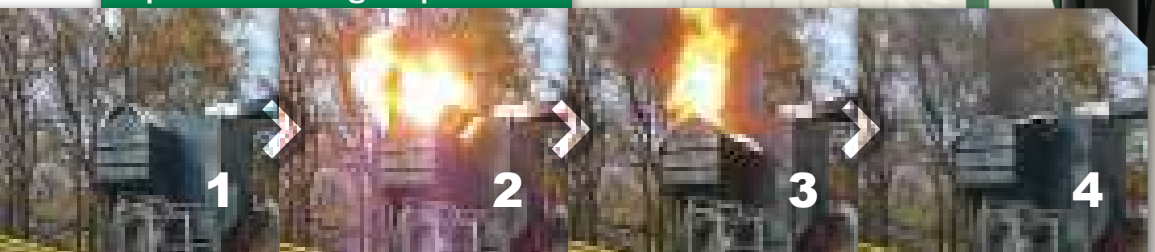
Designed to install over a standard explosion vent, the "FlamQuench FQ" extinguishes the flame front exiting the vented area not allowing it to exit the device. This allows conventional venting to be accomplished indoors where it could otherwise endanger personnel and/or ignite secondary explosions.

OR

Chemical Suppression

Designed to react within milliseconds of detecting an explosion, a chemical suppression system is installed in the collectors dirty air section. The chemical suppression system prevents expanding a deflagration by releasing a chemical agent. This system is often used in order to put combustible dust collectors inside the factory where you can't vent to the outside.

Explosion Venting Sequence



REDUCE **ENERGY COST**

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ABOUT THE STINGER

Composite Blade Advantages: (Patent Pending)

- Low weight
- Lower pressure drop
- Wear resistant liner
- High strength to weight ratio
- Smooth back
- No dust accumulation
- Easily replaceable
- Absorbs damage evenly and protects main valve components from damage during activation

Square Shaft Advantages: (Patent Pending)

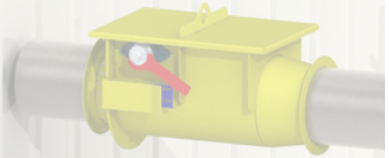
- Easy blade change out
- No slip locking arm attachment
  Latching Mechanism Advantages: (Patent Pending)
- No slip locking collar on square shaft
- Fully adjustable for initial position
- Self-adjusting during activation

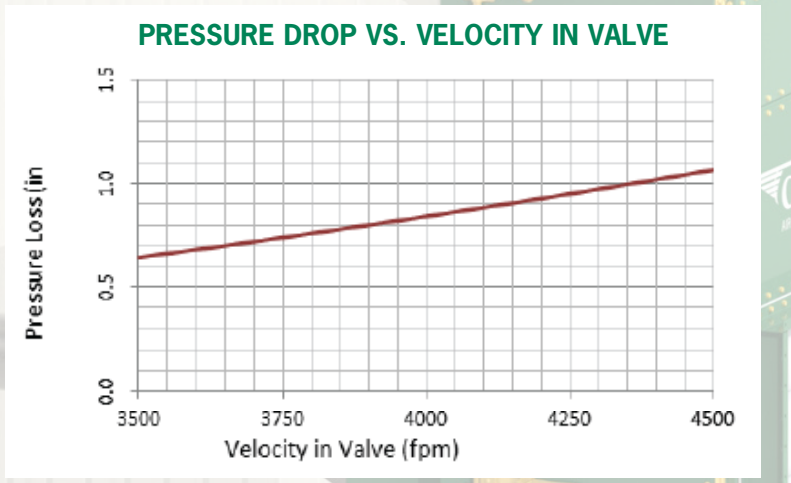
Housing Features:

- Inlet flow inspection port added to assess blade coating wear
- Mounting support feet designed into housing stiffeners for help with duct support layout
- Lifting lugs added to inspection cover and housing to help with installation and inspections
- Removable blade seat if it needs replacing
- Designed to minimize dust accumulation around blade seat
- Designed to maintain conveying velocities in valve
- Max pressure 1 bar without yielding
- Flanges are industry standard angle ring flanges
- Color: Safety Yellow
- Single door top access for inspection and maintenance

Activation Sensor

- Non-contact magnetic reed switch
- Normally open or normally closed contact option
- NEMA 4 junction box with terminals for easy field connections
- Hermetically sealed corrosion resistant sensor
- Maintenance free





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EXPLOSION TESTED **TO EN 16447**

The blades are made from a composite material for strength and minimum weight. Low weight is necessary for the valve to close with the highest possible speed. The design also eliminates the need for stiffeners on the back of the blade. Stiffeners allow dust build up on the blade, which increases the weight and thus, pressure required to hold the blade open. Dust on the back of the blade is also undesirable because it would provide additional fuel for the deflagration.

The front side of the blade is covered with a 3 mm abrasion resistant rubber sheeting. This does not contribute to the strength of the blade, but maintains it by protecting it from wear. Wear on a blade reduces its strength and could contribute to failure during a deflagration.

The wear liner also acts as a wear indicator. If the metal behind the liner is seen during routine inspections, it will indicate that the blade needs to be replaced. The valve seat is also replaceable but did not sustain damage during dozens of tests. The blades bolt to the square pivot shaft and are replaceable.

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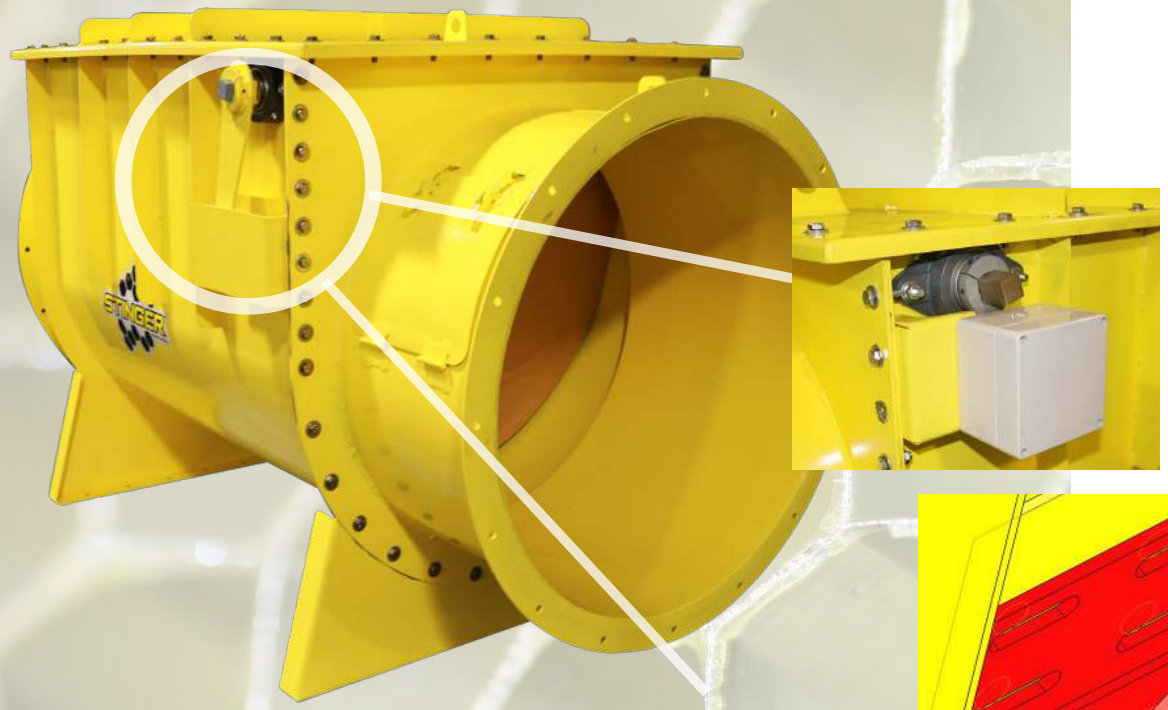
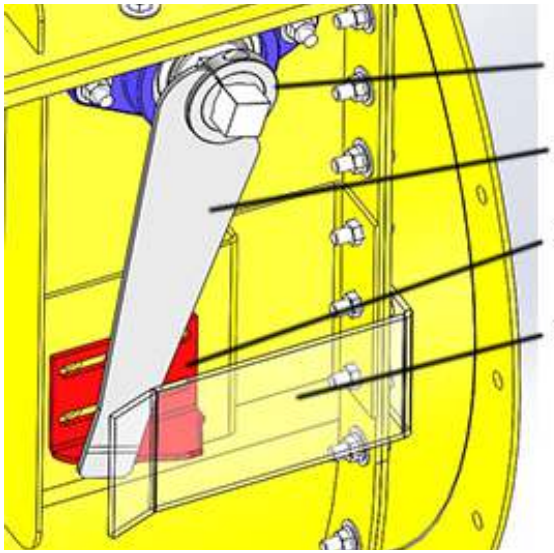
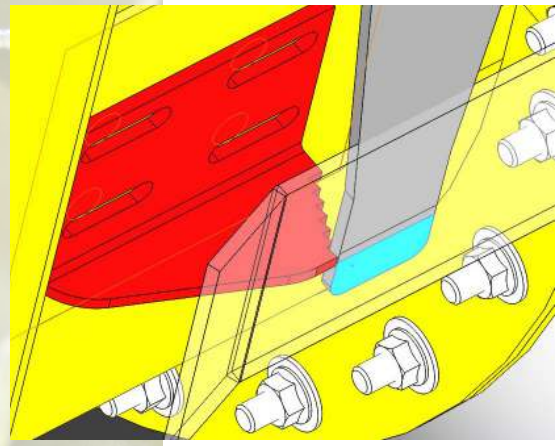
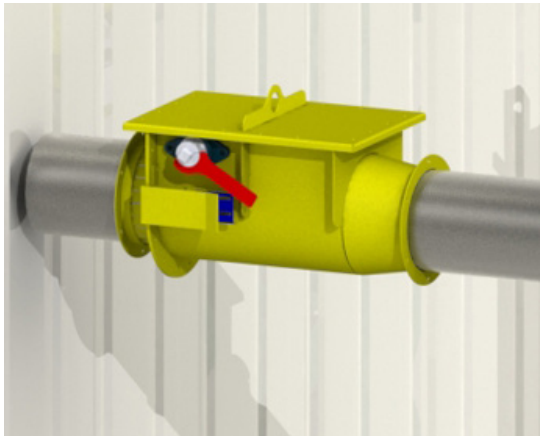
PATENT PENDING **LOCKING SYSTEM**



A magnetic sensor is mounted on the shaft opposite the locking mechanism. It provides a signal to indicate that the valve has been activated.







A self-adjusting latching mechanism engages when the valve closes and holds the valve shut during the deflagration. This mechanism will not engage during normal shutdown of the system fan.

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SPECIFICATIONS:
NFPA Compliant: Yes

COMBUSTIBLE MATERIAL:
Dry organic and metal dust with:
50≤KST≤200 bar*m/s
MESG≥2.3mm
Not suitable for flammable gases/vapors
or hybrid mixtures of dust and gases/vapors

PROTECTED VESSEL:
Vented with non-reclosing venting devices

SYSTEM CONFIGURATION:
Pull flow through valve and protected vessel only

FLOW DIRECTION CHANGES BETWEEN VALVE AND PROTECTED VESSEL:
1 including an abrasion resistant inlet, 2 without an abrasion resistant inlet connecting vertically from below the valve.

OPERATING TEMPERATURE: -4° to 122° f

INSTALLATION POSITION: Horizontal only

VALVE MAXIMUM PRESSURE RESISTANCE: 14.5 psi

MAXIMUM DUST LOADING: 174 grains/ft3

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Table 1. Performance Limits Organic Dust

Size	Flow Capacity (cfm)		Length	Installation Distance "L"		Pred	Min Volume of Protected Vessel
inches	Min	Max	inches	Lmin ft	Lmax ft	psi	ft^3
6	590	1050	23.25	6.5	19.5	11.6	14.1
8	1050	1750	27.00			8.7	31.7
10	1640	2730	31.25				
12	2360	3930	33.25				
14	3210	5350	35.75				
16	4190	6980	36.00				
18	5300	8840	39.00	9.75		7.25	120
20	6540	10910	41.75				
22	7920	13200	44.75				
24	9420	15710	47.75				
28	12830	21380	54.25			6.5	211.8
32	16760	27930	60.25				
36	21210	35340	66.25				
40	26180	43630	72.25				

* Maximum flow velocity 5900 fpm. Exceeding recommended flow rates above will result in higher pressure loss and abrasion.

Table 2. Performance Limits Metallic Dust

Diameter Model	ST1 Metal	Min protected volume* ft^3	Lmin – LMax** ft	Max Pred*** psi
305 mm (12')	X	31.7	11.4 - 16.4	7.2
355 mm (14')	X	56.5	11.4 - 16.4	4.3
400 mm (16')	X	56.5	11.4 - 16.4	4.3
450 mm (18')	X	56.5	11.4 - 16.4	4.3
500 mm (20')	X	56.5	11.4 - 16.4	4.3
560 mm (22')	X	56.5	11.4 - 16.4	4.3
610 mm (24')	X	56.5	11.4 - 16.4	4.3

* The valve can not be used to protect a smaller volume than the minimum protected volume.
** The valve must be installed at a distance between Lmin and Lmax from the protected vessel.
***The protection of the vessel must be designed not to exceed the maximum allowed Pred.

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