

Explosion Mitigation and Fire Protection in Milling

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Who are We?

- 20 yrs of experience in secondary/tertiary processing
- “Be the Behst” – best-in-class approach
- Manufacturer’s rep operating for multiple vendors
- Acting as an EP in EPC landscape
- Farm boy meets city kid

Explosion Mitigation and Fire Protection

- <https://www.youtube.com/watch?v=cJuLr4hemIU&list=PPSV>

Explosion Mitigation and Fire Protection



Canadian Milling Industry Grade

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- Notes
 - a) Lax standards relative to USA
 - b) Poor gov'n't auditing/policing
 - c) General viewpoint of protection being a cost center instead of cost saver
 - d) Under investment in aging facilities and relative to other industries
 - e) Belief that standards are grandfathered

Canadian Milling Industry Grade



What Are We Talking About?

- **NFPA 61** Standard For The Prevention Of Fires And Dust Explosions In Agricultural And Food Processing Facilities
- **NFPA 68** Standard On Explosion Protection By Deflagration Venting
- **NFPA 654** Standard For The Prevention Of Fire And Dust Explosions From The Manufacturing, Processing, And Handling Of Combustible Particulate Solids
- **NFPA 69** Standard on Explosion Prevention Systems



Misconceptions and Alternate Viewpoints

“Retroactive vs Grandfathered”

Check your local jurisdictions fire code references

Misconceptions and Alternate Viewpoints

- Protection is a need to do vs a should do
 - i) Leads to a cost center mentality
- Mindset shift from only compliance
 - i) The lens of business loss
 - i) Mill down time = very expensive (smoke damage, machine failure, wall penetrations)
 - ii) Business interruption insurance premiums and availability
 - iii) Product damage and recall (both in situ and on going)



Misconceptions and Alternate Viewpoints

- Employee safety and comfort
 - i) Employee injury or loss of work
- Energy savings
 - i) Air is expensive! Ability to return air in cold climate a major benefit
- Calculate your ROI, it's often overwhelming one sided

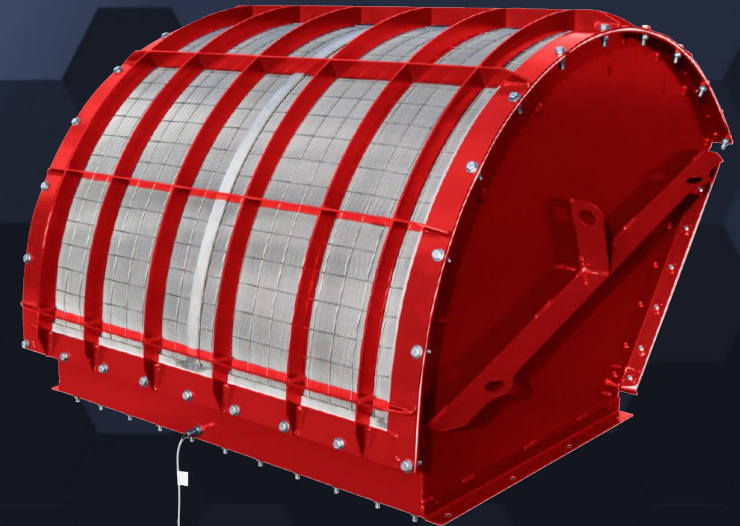
Evaluating Risk

- Fuel Sources
- Ignition Sources
- DHA (Dust Hazard Analysis) – Get an up to date one!
 - i) Kst/Pmax values – Milling, specifically grain dust has some of the highest across all industries

How to Address?

- Conventional
 - High-Speed Abort Gates
 - Explosion Panels
 - Suppression System
- Novel and New
 - Flameless Vents
 - Isolation Valves
 - Fire-break shutters

How to Address?



Conventional Means

- Pros

- Tried and true
- May be the only option (suppression)

- Cons

- Complexity
- Not suitable for interior environments (X-panels)
- High Cost
 - i) Both initial capital cost and maintenance/reset

New and Novel Means

- Pros

- Inexpensive – low initial and ongoing investment
- Suitable for all interior environments
- Simplicity
- Increased up time after incident
- Helps minimize or eliminate secondary damage (fire-break)
- Allows longer evacuation time (fire-break)

- Cons

- Not suitable with all products (corrosive/abrasive)
- May be an adder rather than substitute component
- Can be costly if multiples are needed (flameless vents)

How do they work?

Non-Return Valve

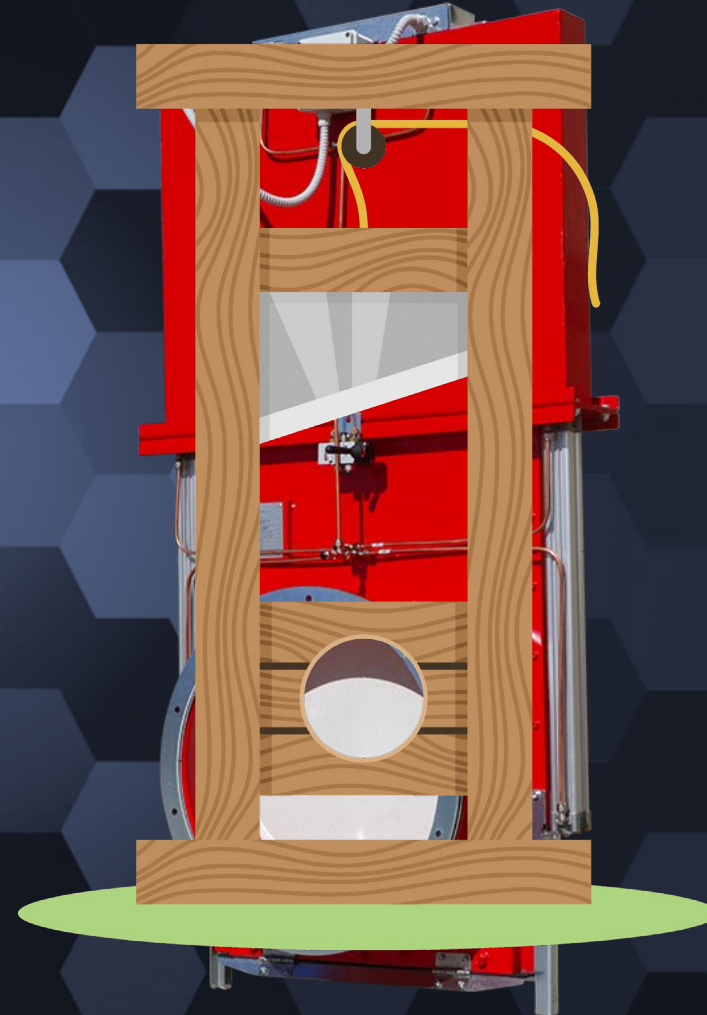
- Pressure rise in ducting causes gate to close
- Isolates explosion between filter and valve



How do they work?

Fire-break Shutter

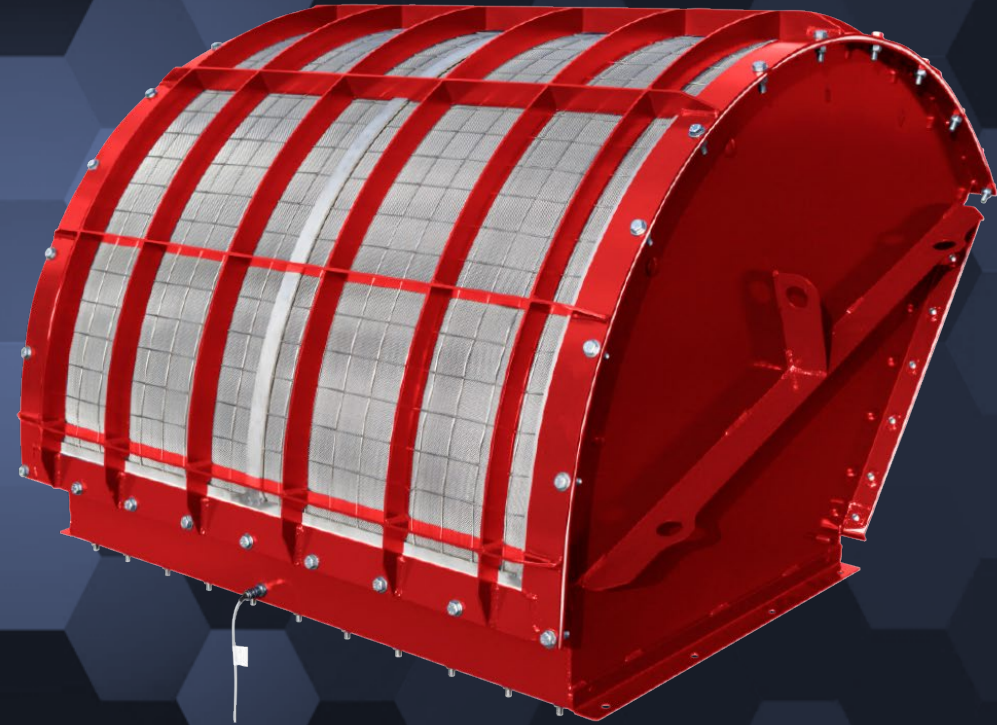
- Measures temp in ducting
 - Fusible link or powered
- Cuts off air to fire/explosion
 - Guillotine motion



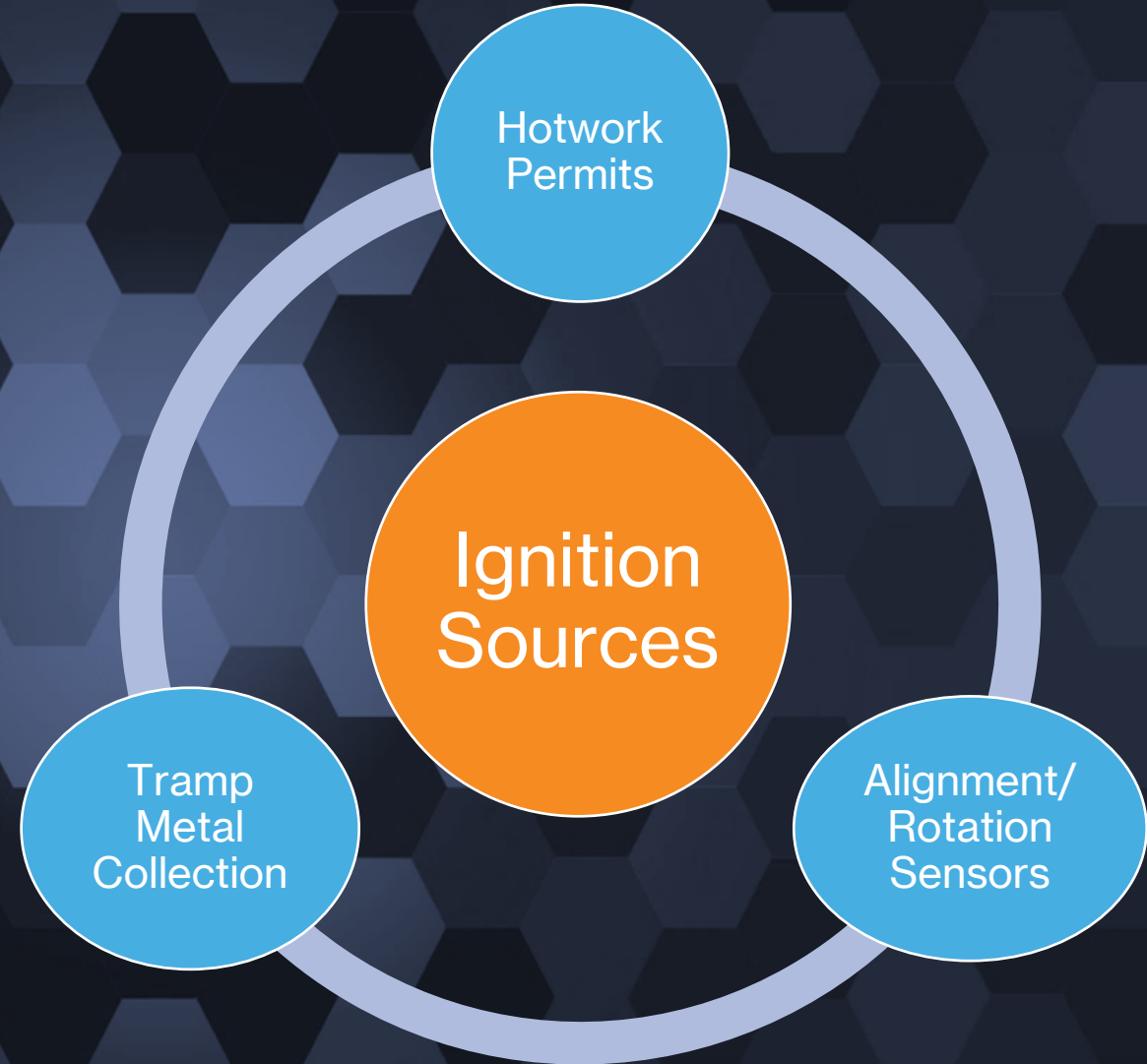
How do they work?

Flameless Vent

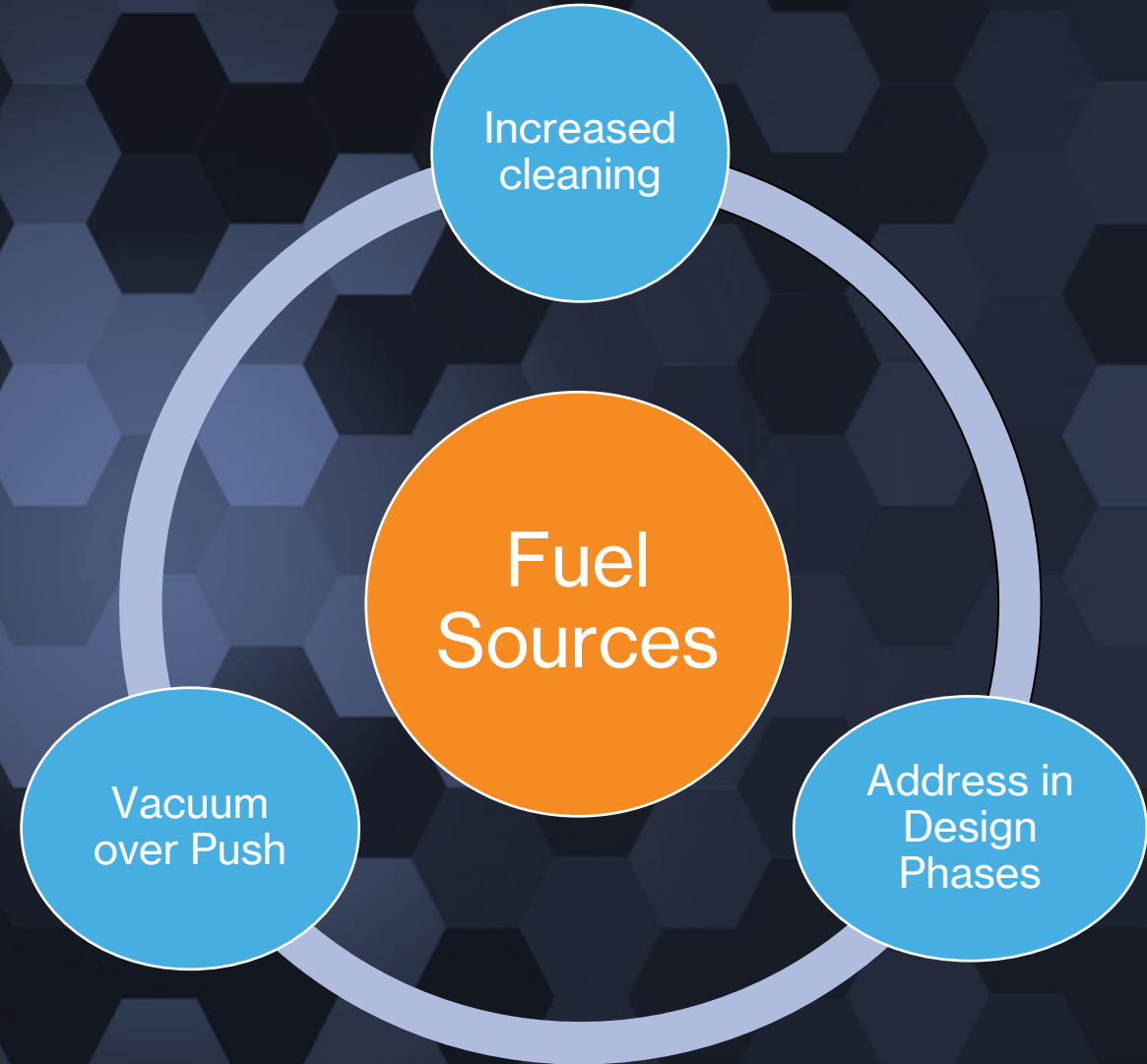
- Diffuses explosive flame/blast through fine multi-layer metal mesh



Other Ways to Manage Risk



Other Ways to Manage Risk



Hey Hey, What Do You Say?