

IAOM LEBANON 2019

**DUST EXPLOSION
RISKS :
HOW TO PREVENT IT?**

SPEAKERS



Sales Manager
MIDDLE EAST & AFRICA
Nariman BARAKAT
Email : nariman.barakat@stifnet.com



Sales & Marketing STIF FRANCE
Jordan HUREAU
Phone : +33 (0) 2 41 72 16 82
Email : jordan.hureau@stifnet.com



Product manager protection & explosion
Povl Hansen
Email : polv.hansen@stifnet.com



KEY FIGURES AND PRODUCTS



Founded in 1984.



Located in St.-Georges sur Loire, France



Surface : 12000 m² of manufacturing and offices



2018 sales of **20 000 000 €** for STIF France



2018 sales of **25 000 000 €** for STIF group



Exports to 60 countries account for over 70% of sales

Our range of products :

BULK HANDLING COMPONENTS :

- Elevator buckets
- Elevator Belts
- Compression couplings
- Sealed inspection doors



EXPLOSION PROTECTION SYSTEM :

- Electronic equipment
- Explosion vent panel
- Flameless venting
- Explosion isolation valve



VIGILEX®

SAFETY PROTECTION By **stir**

CHAPTER I

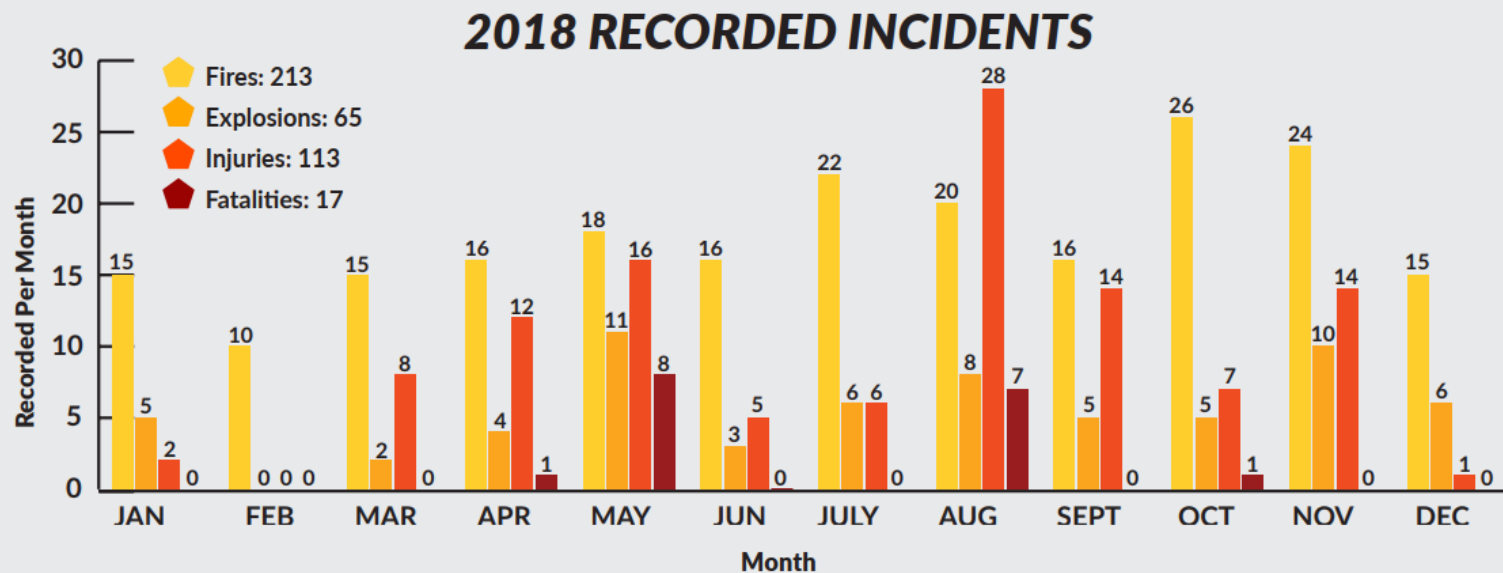
FACTS BASIC CONCEPTS AND CONSEQUENCES



FACTS

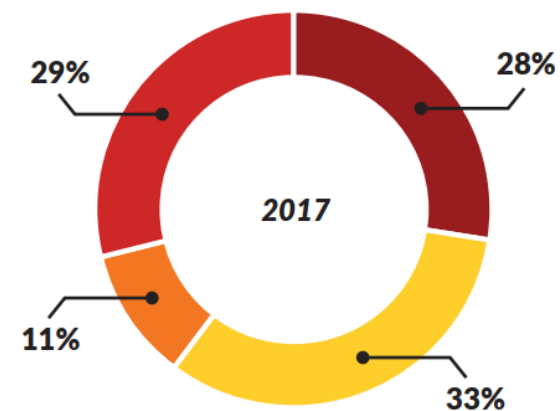
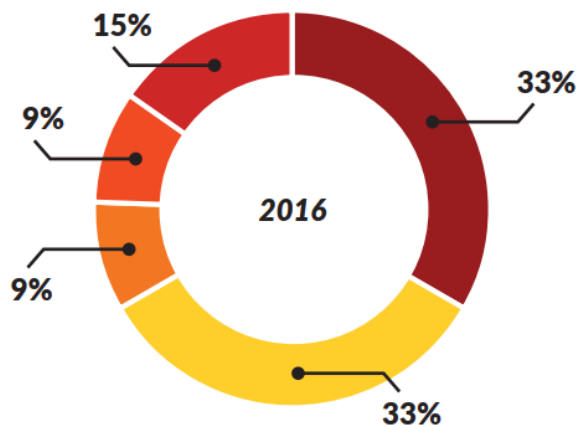
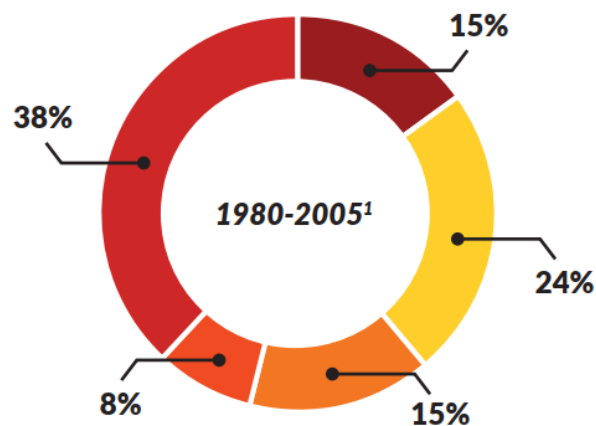
INCIDENT DATA OVERVIEW Source « Combustible dust incident report 2018 » by Chris Cloney

	UNITED STATES			CANADA			INTERNATIONAL	
	2016	2017	2018	2016	2017	2018	2017	2018
Fires	---	117	158	---	15	17	37	38
Explosions	31	28	36	2	4	4	36	25
Injuries	22	52	39	0	9	1	102	73
Fatalities	3	6	1	0	0	0	7	16



FACTS

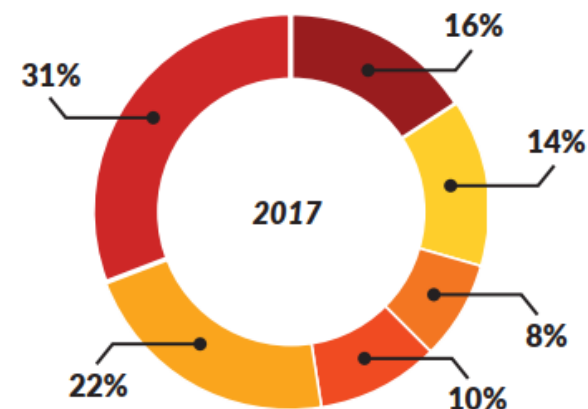
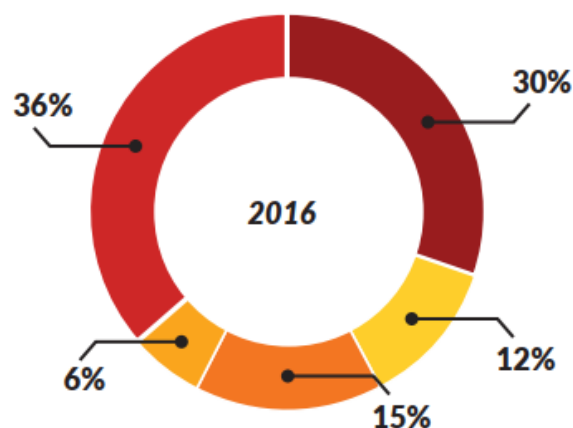
INDUSTRIES INVOLVED



FACTS

EQUIPMENT & CAUSES

■ Dust Collector
 ■ Storage Silo
 ■ Other Storage
 ■ Elevator/Conveyor
 ■ Other
 ■ No Details



No data for 1980-2005

THE CONSEQUENCES



BASIS CONCEPTS FOR DUST EXPLOSION

The **fire triangle** or **combustion triangle** is a simple model for understanding the necessary ingredients for most fires.



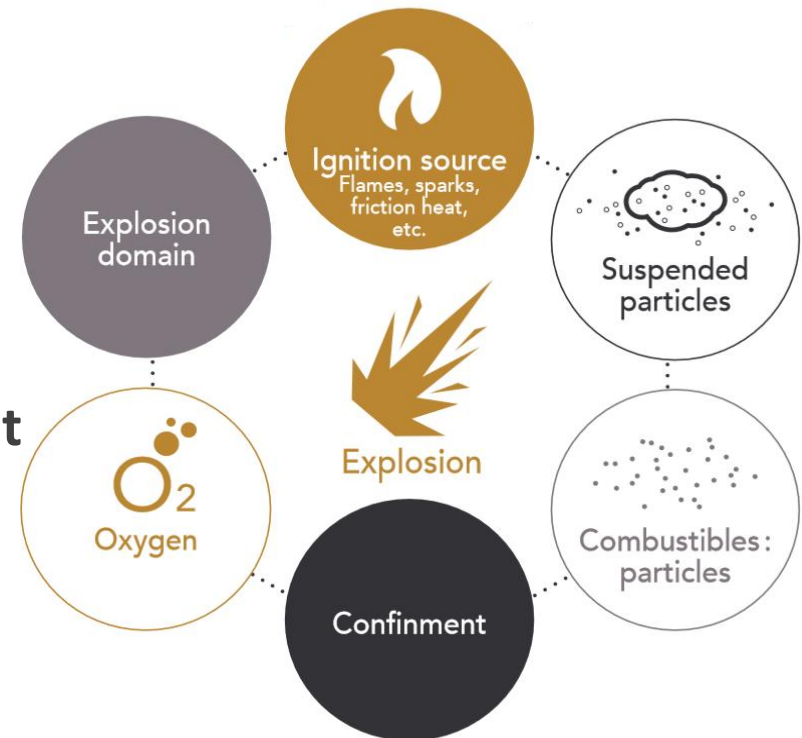
The triangle illustrates the three elements a fire needs to ignite:

Heat, Fuel, and an Oxidizing.

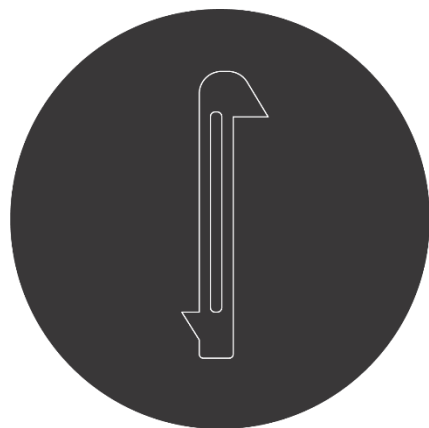
BASIS CONCEPTS FOR DUST EXPLOSION

6 Requirements for a dust explosion

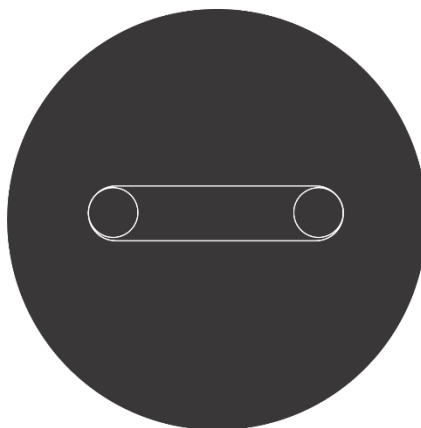
- **Combustible dust (fuel)**
- **Ignition Source (heat)**
- **Oxygen in air (oxidizer)**
- **Dispersion of dust particles in sufficient quantity and concentration**
- **Confinement of the dust cloud**
- **Explosion domain**



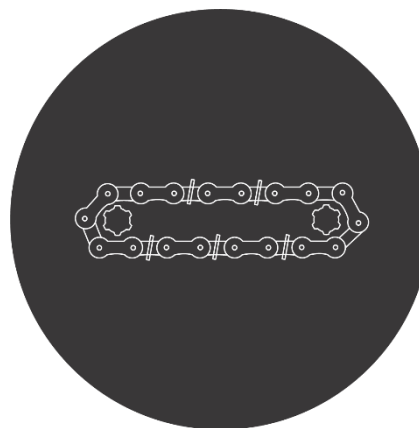
WHICH MACHINERIES ?



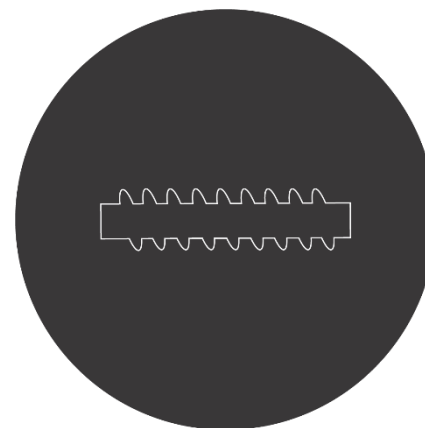
BUCKET ELEVATOR



BELT CONVEYOR



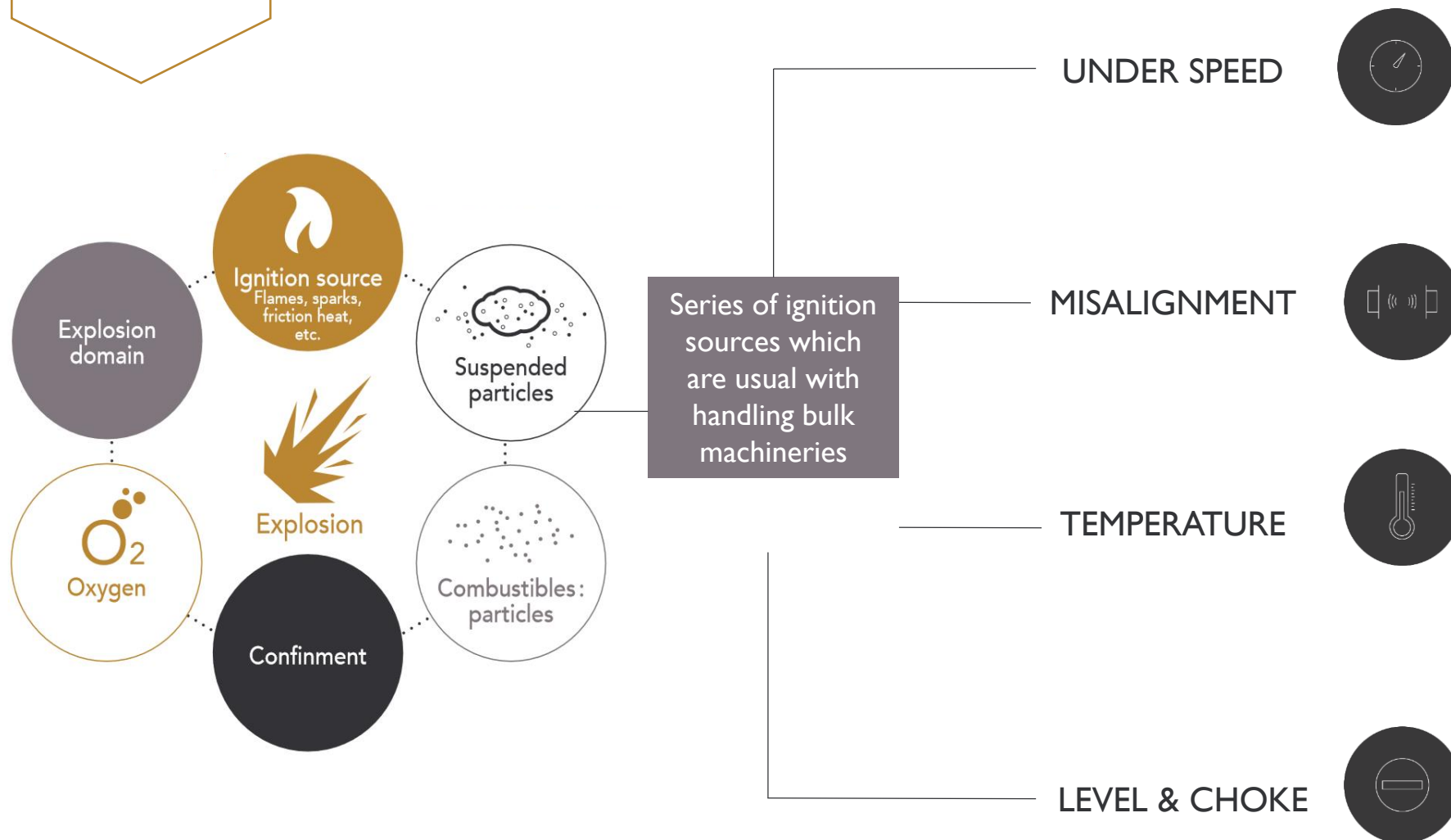
CHAIN CONVEYOR



SCREW CONVEYOR



IGNITION SOURCES



THE CONSEQUENCES

CBS NEWS June 1, 2017, 2:10 AM

Massive explosion rocks Wisconsin plant, sparks fire

Comments / [f Share](#) / [t Tweet](#) / [S Stumble](#) / [@ Email](#)

Last Updated Jun 1, 2017 4:39 PM EDT

CAMBRIA, Wis. -- A Wisconsin corn mill that exploded late Wednesday night was reprimanded by federal safety inspectors six years ago for not taking precautions against dust explosions, which are a major hazard in handling grain, records show.

Numerous fire crews raced to the scene of the large explosion and fire in a corn milling plant about 45 miles northeast of Madison, Wisconsin, **reports CBS Madison affiliate WISC-TV.**

The blast left at least one person dead. Emergency workers were still searching for two employees as of Thursday afternoon. A dozen other employees were taken to area hospitals. None of the workers have been identified.

The cause of the blast remained unknown as of Thursday afternoon, Didion officials said. U.S. Occupational Safety and Health Administration investigators were on the scene.

"The safety and security of our employees is our top priority," Didion Vice President of Operations Derrick Clark said in a news release. "Over the past 44 years, the Didion team has grown to be a close-knit family, and we ask for your prayers during this difficult time."



CATASTROPHIC EXPLOSION AT THE PORT WENTWORTH REFINERY

Fourteen people were killed and dozens injured in an inferno on Feb. 7, 2008, when a fire and explosion tore through the refinery.



THE CONSEQUENCES

China Jiangsu
Kunshan Factory
Plant Explosion
over 65 dead of
burning and
hundred
injured.
2014

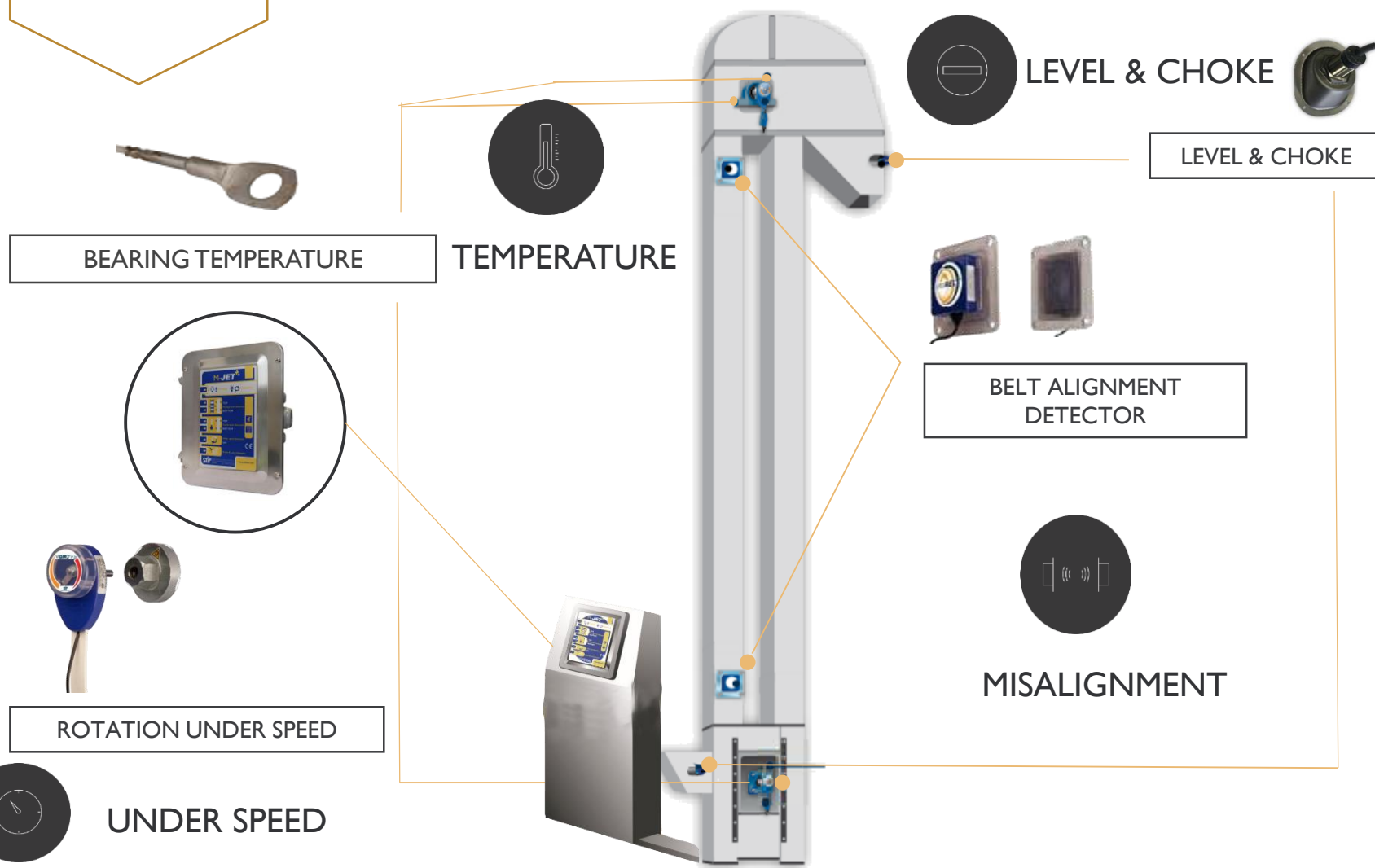


CHAPTER 2 SOLUTIONS

How to prevent and
limit dust explosions
effects ?

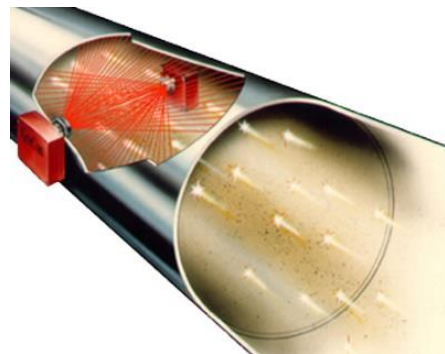
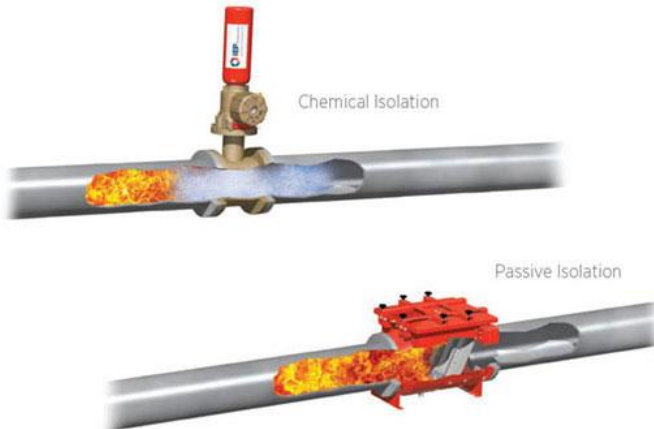


RANGE OF SENSORS TO PREVENT



ACTIVE vs PASSIVE EXPLOSION VENTING

Active products may stop an explosion by detecting an ignition source, as a spark, and by a chemical or mechanical system avoiding the explosion propagation on the process.



Passive products are releasing the overpressure or the explosion to protect the application by the overpressure or the explosion itself. It is like the « fuse » of the process .



SOME WAYS TO LIMIT DUST EXPLOSIONS EFFECTS

Methods to optimize safety of personnel and equipment during a dust explosion with passive protection:

Venting— An appropriately sized vent is designed to release the pressure of a deflagration before it can build to pressure levels greater than the vessel can withstand - Flames and unburned fuel mix will be vented before an explosion can occur.



Flameless venting—This method releases pressure and extinguishes flames and can be used with an explosion vent. It eliminates the need for equipment relocation to outdoors or ductwork on indoor venting.



Isolation — The bulk of damage caused in combustible dust explosions systems from the secondary explosion.

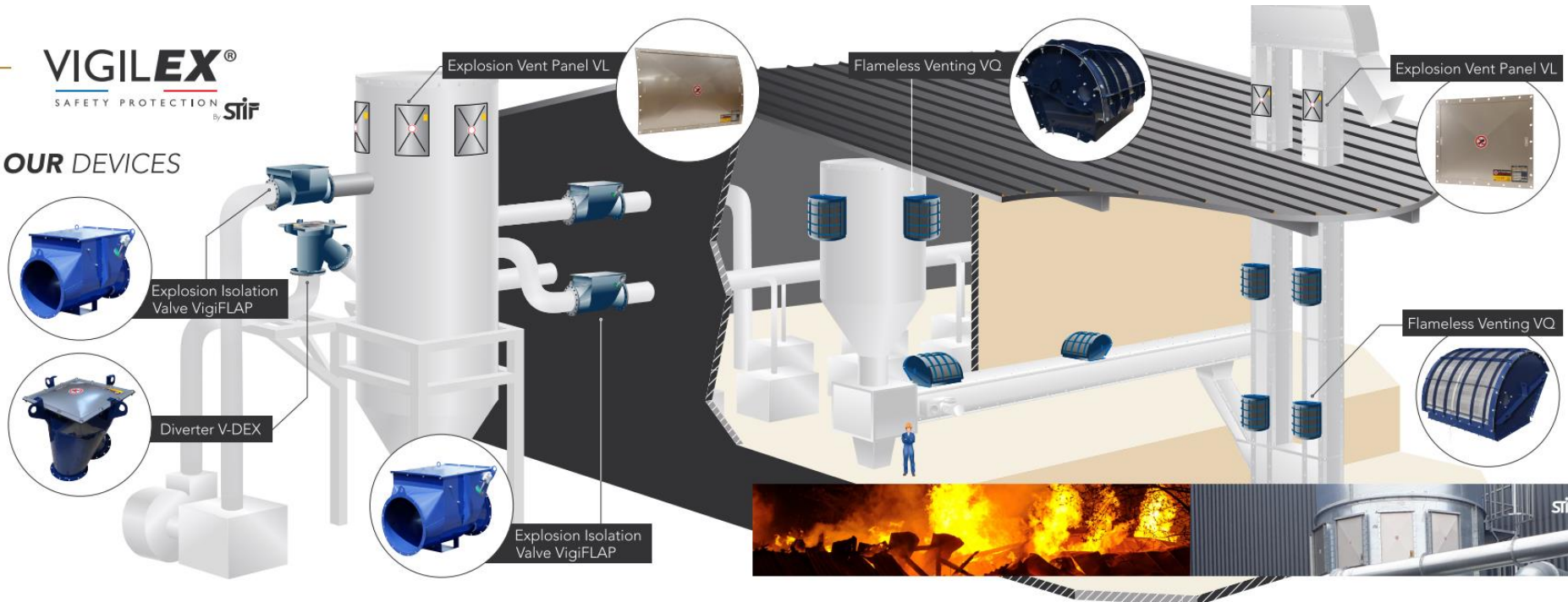
To prevent an explosion/deflagration from spreading, it is necessary to isolate each process. Separating each process helps to ensure the containment of the initial explosion.



OUR SOLUTIONS

VIGILEX®
SAFETY PROTECTION By **stif**

OUR DEVICES





THANK YOU