Since 1956

# Protecting Critical Facilities Against Explosions

IEP TECHNOLOGIES
HOERBIGER Safety Solutions

www.IEPTechnologies.com

# IEP Technologies™: The Name to Trust for Explosion Protection

IEP Technologies is the worldwide leading provider of explosion protection systems and services. For over 60 years we have provided protection solutions that can suppress, isolate and vent combustible dust or vapor explosions in process industries. IEP Technologies operates through locations in the U.S., Germany, Switzerland, U.K., France, Turkey, Brazil, China and Singapore designing and servicing systems with a dedicated team of application engineers, regional sales managers and field engineers.

**What sets IEP Technologies apart...**

### Unsurpassed Verification and Approvals

IEP Technologies has conducted thousands of full-scale explosion tests to better understand the science behind flame propagation and verify our protection solutions. Our products are FM approved and ATEX compliant. IEP Technologies is the only provider in the industry with Design Calculation Tools that are ATEX approved. This means that every design using our Design Calculation Tools is ATEX approved. From design to service, you can have confidence in the solution IEP Technologies provides.

### Combustion Research Center

Our state of the art facility is fully-equipped and dedicated to the ongoing study of explosions and the constant advancement of explosion protection science. Understanding the explosibility of your product is the first step in developing your protection solution.

### Single Source Responsibility

Whether the application calls for an integrated explosion detection and suppression system, a venting device, a custom isolation system, or any combination; IEP Technologies can meet the challenge with a turnkey solution...from design to 24-hour emergency response.

### Explosion Protection Professionals

The IEP Technologies team, including our sales representatives, field & applications engineers and service technicians, have a unique skill to support you. Each understands not just the IEP Technologies product range, but also your process and how our solutions can help protect it.

### Worldwide Service

IEP Technologies recruits, trains and retains the finest network of Authorized IEP Technologies Service Centers providing fast response resulting in a minimum of disruption to our customers' operations. These service centers are backed by IEP Technologies with over 50 strategically located, factory technicians who provide on-site technical support to our customers.

# The Costly Consequences of an Explosion

Consider the devastating effects an explosion could cause in your manufacturing plant or processing facility. Your process could be shut down for days or even weeks. The business interruption and resulting lost productivity could put your company at a competitive disadvantage in the marketplace. The cost of insurance coverage could increase dramatically. Or even worse, your employees could sustain serious or even fatal injuries.

The average dollar loss per explosion incident in a typical year is $3.4 million.

Total losses from explosions are four times the amount of losses from all other causes including fire.

Explosions account for less than 4% of all interruptions but nearly 40% of all losses.

Courtesy of US Chemical Safety Board

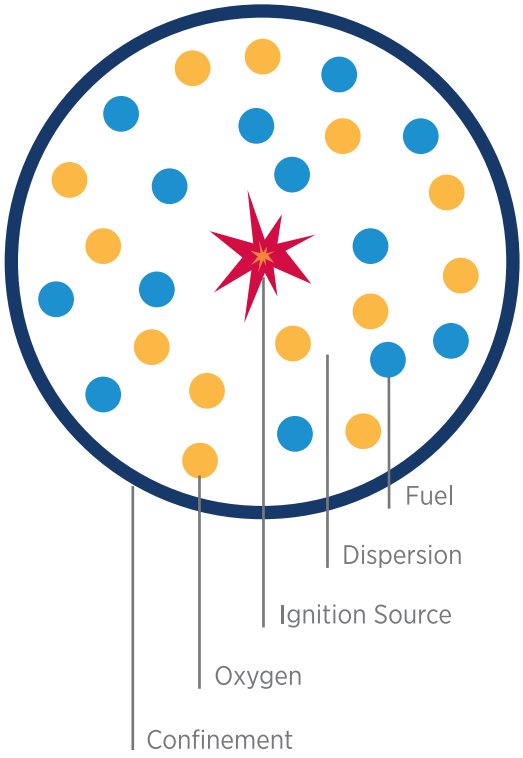
# The Anatomy of an Explosion

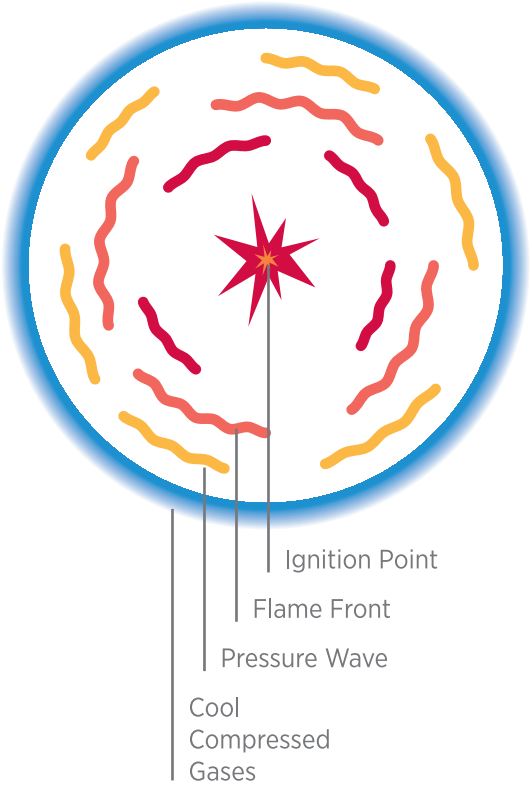
### Why Does It Happen?

A deflagration explosion requires five elements; fuel, oxygen, dispersion, an ignition source and a confined space. Does your process generate these elements? Fuel can be a bulk material that is dispersed as a cloud of fine particles, a flammable gas or a volatile chemical that creates vapors. Oxygen is readily available in most plant processes. Ignition can be generated by a flame, a welding arc, spontaneous combustion, frictional or electrostatic sparking. Finally the majority of plant processes can provide the confined space. Once all five elements are brought together, the potential for an explosion can exist in your plant.

### How Does It Develop?

An explosion is a propagating combustion wave – or deflagration – moving at less than the speed of sound. A flame front travels initially at slow speeds but increases velocity quickly which forms a leading high pressure or shock wave. Since most industrial processes are not designed to withstand the pressures developed in an explosion, a rupture occurs in the process releasing a destructive pressure shockwave and flame. The subsequent damage can include a much larger secondary explosion occurring when the initial explosion disturbs dust layers within the facility itself as well as a post-explosion fire.



# Where Can An Explosion Strike?

### Explosive Materials

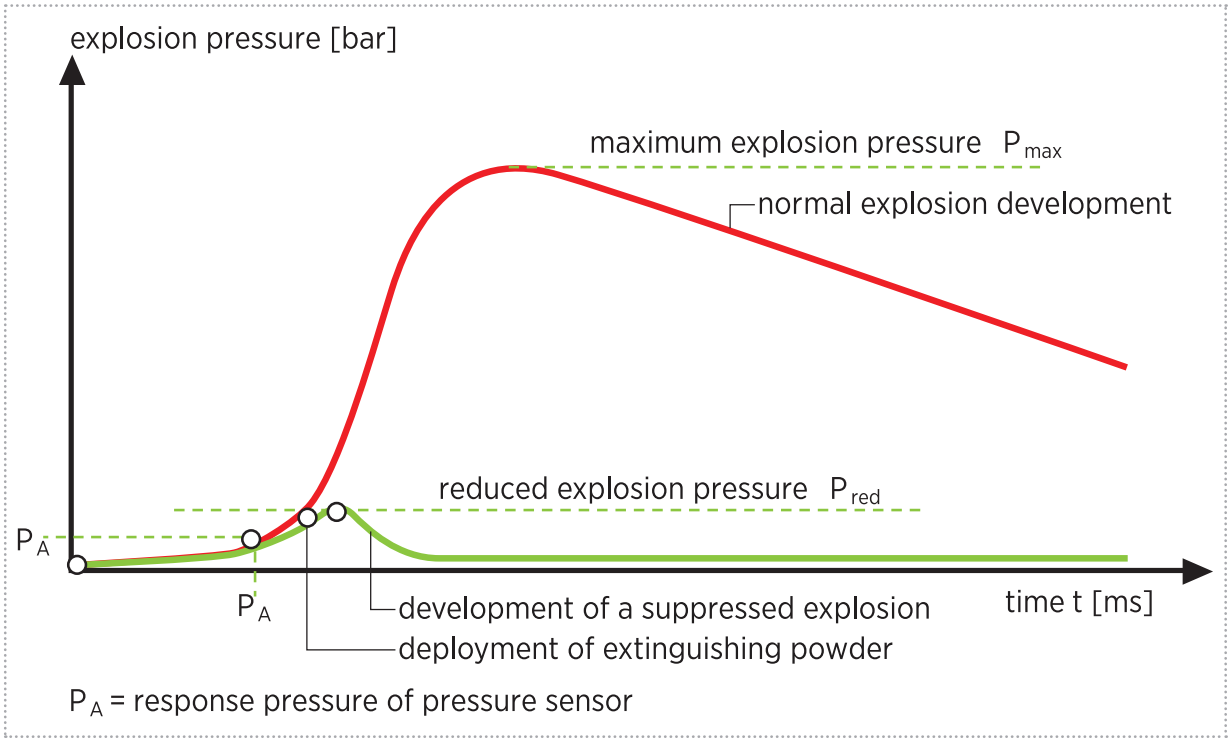
As a rule, if a material can burn, under the right conditions, it can and will explode. Any facility that handles, stores or processes flammable gases, liquids or solids has some degree of explosion risk.

Dusts explosions happen regularly and with products you may not expect. Cellulose, Fungicides, Plastics and Resins to name a few but Chocolate, Flour, Paper and Starch can be dusts at risk as well.

Vapors at risk cover a broad spectrum from Acetone to Toluene with many in-between.

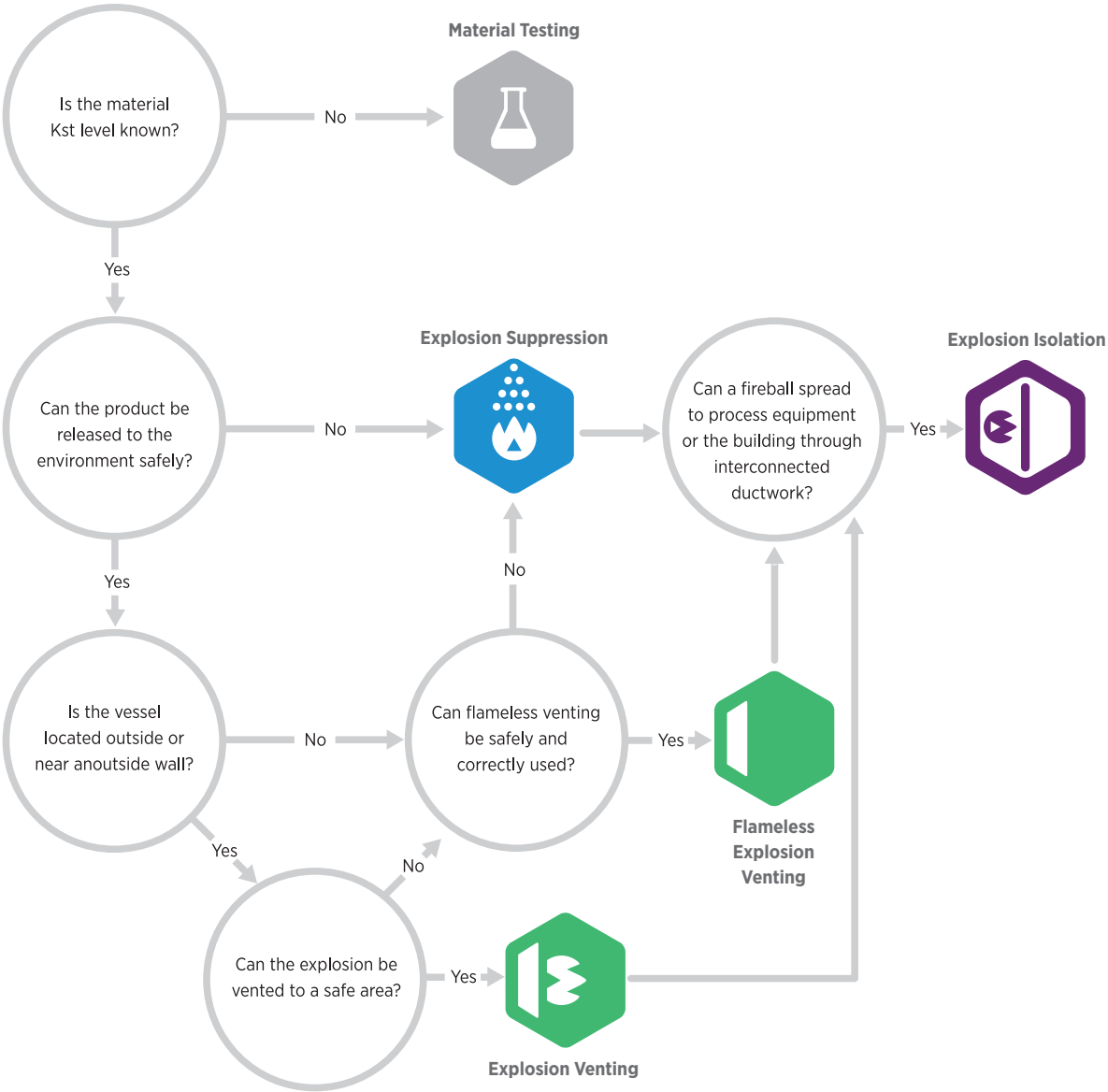
### Explosive Environments

Conveying, processing, pulverizing or storing of combustible materials can provide the containment needed to elevate a fire risk to an explosion risk within your facility.



# Selecting the Right IEP Technologies System

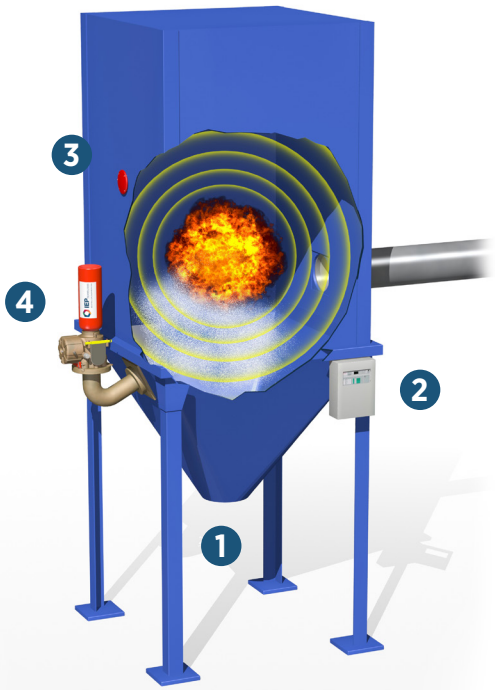
There are three basic system types employed for explosion protection...venting, isolation and suppression. The flow chart below uses a dust collector as a typical application to show the process IEP Technologies engineers take to select the most appropriate system(s) to specifically fit your application. We are always available to assist you in determining the most suitable explosion protection approach for each of your applications.



# IEP Technologies Explosion Suppression Systems

**Detect and Suppress Explosions in Milliseconds.**

In a matter of milliseconds, your IEP Technologies Explosion Suppression System is designed to detect the buildup of pressure during an explosion and discharge an explosion suppressant into the enclosed space before destructive pressures develop. The suppressant works by interfering with the explosion's reaction, by removing heat from the deflagration's flame front and thereby lowering its temperature below that needed to support combustion. The explosion suppressant also creates a barrier between the unburnt combustible particles to prevent the further transfer of heat.




**1.** Protected Equipment
**2.** Control Panel
**3.** Pressure Detector
**4.** Explosion Suppressor

Pistonfire II™ Suppressor

Mex-3™ Pressure Detector

EX-8000 Control Panel

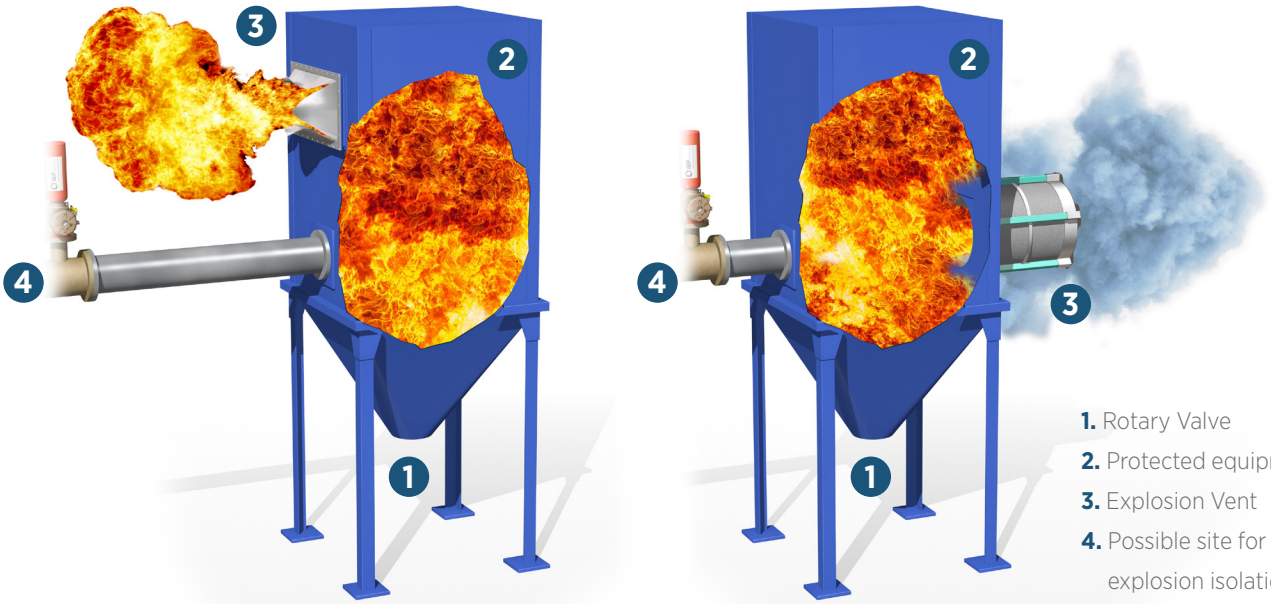
EX-200™ Control Panel

# IEP Technologies Explosion Venting Systems

**Relieve Explosion Pressure Safely.**

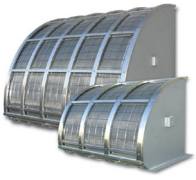
An IEP Technologies Explosion Vent is a relief device that ruptures at a predetermined pressure to allow the fireball and explosive pressure to vent to a safe area. Rupture style vents are economical to install and these highly efficient vents fit into the walls of a process volume. They are available in a variety of sizes, configurations and materials to ensure fast reliable operation during an explosion event.

IEP Technologies also offers a range of Flameless Vents which are designed to quench the flame front and relieve the pressure. This vent is typically used in applications which cannot be vented to a safe, outside area. Either vent type is typically installed in conjunction with an IEP Technologies Isolation System.




**1.** Rotary Valve
**2.** Protected equipment
**3.** Explosion Vent
**4.** Possible site for explosion isolation equipment

EVN
Flameless Vent



KFD Type "E"
Flameless Vent

Explosion Relief Vents

# IEP Technologies Explosion Isolation Systems

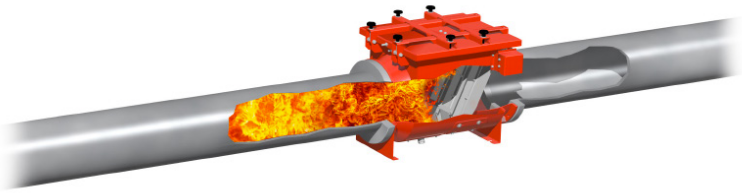
**Isolate Explosions – Chemically or Mechanically.**

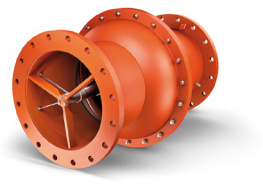
IEP Technologies Isolation Systems are designed to detect an incipient explosion and react to minimize the risk of the deflagration from travelling between interconnected equipment within your process. The Chemical Type isolation method discharges an explosion suppressant into pipeline/ductwork mitigating the passage of flame and burning materials to interconnected equipment.

The Mechanical Type isolation method can be designed using either an “Active” product such as the IEP Technologies high speed knife valve or a “Passive” product such as our ProFlapPlus or Ventex systems.  Each of these provide a mechanical barrier which isolates the deflagration event.

Chemical Isolation

Passive Isolation

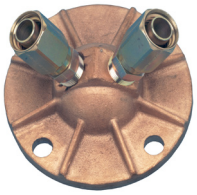




Ventex Passive Isolation Valve

ProFlapPlus™ Passive Isolation Valve

Infrared Detector



Single/Dual Exit Isolation Head

# The IEP Technologies Process: Precise Protection For Every Application

IEP Technologies has more worldwide experience protecting a wider range of facilities against explosions than any other company. With well over 15,000 systems installed, we have developed a unique process to ensure the highest level of protection for your facility. The IEP Technologies process includes:

### Material Testing

The IEP Technologies Combustion Research Center using recognized test methods, such as those published by ASTM, U.S. DOT, UN, and others, can conduct testing to determine the combustion properties of your process material including dusts, liquids, and gases. Understanding the characteristics of your material is the first step in designing a suitable protection solution.

### Site Visit

The industry's most experienced Explosion Specialists review your pre-defined hazard to gather data that will assure an IEP Technologies system that is matched to your specific application.

### Training

IEP Technologies offers on-site training programs for the proper operation and understanding of your explosion protection system.

### System Design

IEP Technologies engineers using a proprietary Computer Modeled System Design, develop a protection solution that meets your individual applications needs. We provide key support and documentation at this stage to ensure you understand the overall design. Together with an on-site design and pre-installation meeting, our engineers will review the system performance when employing the recommended solution.

### Installation, Commissioning and Maintenance

Proper installation and commissioning of the explosion protection systems will set the stage for the ongoing successful protection of your process and facility. IEP Technologies supports you from the installation and commissioning stage through to ongoing maintenance and any emergency service/spare parts needs you may have.

## The Next Step

You can't afford to let an explosion threaten your facility. Let us work with you to keep industrial explosions from impacting your bottom line. Call IEP Technologies today.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