



**BS&B PRESSURE SAFETY
MANAGEMENT, L.L.C.**

US patent numbers 5,198,611; 5,934,381 and 6,269,746 apply.

Explosion Protection: Chemical Isolation Systems

IPD

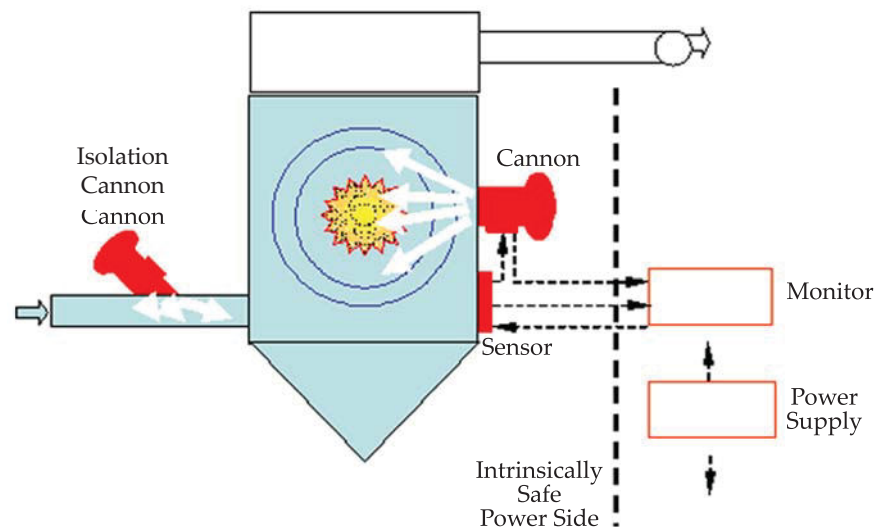
Introduction

The BS&B Type IPD Explosion Isolation System provides protection to interconnected equipment in the event of an explosion hazard. Ducting and piping that may connect process equipment can transport an explosion risk originating within a single piece of equipment. If unprotected, this can present a risk to the ducting and piping itself as well as all the connected vessels and equipment. The Type IPD Explosion Isolation System is designed to inject a suppression agent into ducting and piping to interrupt the transport of burning material.

The initial explosion hazard may be managed by one or more of the following techniques:

- ♦ Explosion Venting
- ♦ Explosion Suppression
- ♦ Explosion Containment

In all cases burning material is produced (a lesser amount when using explosion suppression which activates during the early stages of an explosion to extinguish the developing fireball) which will be transported through the open connections in the protected equipment. Both inlets and outlets are at risk; a normal air flow into the protected equipment will be reversed by the force of an explosive event. The IPD Explosion Isolation System is designed to rapidly inject a suppression agent into ducting and piping to extinguish burning material as it is transported.



IPD Isolation System - Modular Design

There are four components to the IPD Isolation System (from left to right): the System Monitor, the Explosion Detector, the agent injection Cannon, and the Power Supply. When the Explosion Detector registers the pres-



ence of an event it sends an electrical signal directly to the isolation Cannon(s) installed on the equipment ductwork or piping causing the powder suppression agent (food grade sodium bicarbonate) to be energized and discharged. The Detector and Cannon are designed for operation in intrinsically safe electrical environments. The System Monitor provides electrical power to the Detector and Cannon(s). External relays are activated when the Isolation System operates to enable shut down of the protected equipment to end the supply of combustible material and to generate an alarm. The Power Supply provides connection to standard AC power and battery back up.

Depending upon the application, the isolation Cannon size is selected from standard modules identified as 5, 10, 20, 40 and 60 lb. (2, 4, 8, 16, 24 Kg) capacity. Connection to the ducting or piping requires a simple adapter typically having a 45 degree angle to inject the powder into the flow of burning material.

Example of a hybrid application of explosion isolation and explosion suppression: the IPD cannon modules are employed to suppress the explosion in this dust collector and to isolate the inlet ducting providing an extinguishing barrier to burning material as it travels through the ducting.

IPD Isolation System - Activation

The standard IPD Isolation System Detector is pressure driven. Mounted to the equipment in which the explosive event may occur, three pressure sensors respond to the early stages of the pressure wave that precedes the fireball in a deflagration. One of these pressure sensors is set low and provides early warning through the System Monitor of a process condition upset that may cause an unusually high system operating pressure; this is used to prevent non explosion based Isolation System discharge. When two of the three pressure sensors respond, the Isolation System is activated.

Alternative IPD Isolation System activation can be accommodated. Examples include:

- ♦ Sensors fitted to Explosion Vents such as the type MBS Burst Alert® sensor available with BS&B Safety Systems vent panels.
- ♦ Optical sensors (UV, IR or a combination of UV and IR).

When alternative explosion detection means are employed, the Explosion Detector is replaced by a "Detector Interface Module" that receives the sensor output and triggers the isolation Cannon(s) as well as reporting the event to the System Monitor.

Efficiency

The IPD Isolation System is designed for efficient application:

1. Cannons may be installed in any orientation.
2. Lower mass and volume than alternative mechanical devices.
3. Commonality of components; unlike mechanical devices, many cannon components are shared across a range of piping sizes.
4. Piping friendly: absorption of deflagration energy compared to shock effects of fast closing mechanical devices.

Service

The IPD service team is available 24/7 to support new system installation, on-site refurbishment of activated systems, to conduct the periodic audits required by NFPA 69 and to provide customer training.

Application of the IPD Isolation System

BS&B Type IPD Isolation Systems are continuously protecting common industrial process equipment including:

- ♦ Dust collectors
- ♦ Dryers
- ♦ Blenders
- ♦ Silos
- ♦ Grinders

Industries using BS&B Type IPD isolation equipment include:

- ♦ Food processing
- ♦ Grain and feeds
- ♦ Pharmaceutical
- ♦ Chemical
- ♦ Wood



Application of the IPD Isolation System to a dust collector cyclone. The cyclone is explosion protected by a BS&B explosion vent that discharges through a short duct to the outside of the building (not shown). The inlet and outlet ducts are protected by isolation cannons to extinguish burning material that would present an explosion ignition risk within the ducting and inside connected equipment.



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W. T. Maye, Inc. (WTMI)
1-877-705-9864
info@wtmi-usa.com
www.wtmi-usa.com

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