



Spark extinguishing systems  
Fire protection solutions for  
pneumatic conveying systems

*Cool down.  
Fire Protection by*

**MINIMAX**

# SPARKS

are a hazard

# EXTIN

If your company utilizes pneumatic conveying and air filtration systems in the manufacturing process, you are at risk from dust fires and explosions. During the production sparks or glowing embers can easily be produced by the processing machines itself or from impurities in the conveyed material. These potential ignition sources are then picked up by the pneumatic system and transported along with highly combustible wood chips, dust or other finely divided particles. A single spark that enters filters, silos or the dust collector is sufficient to cause fires or dust explosions resulting in excessive damage of property and costly downtimes or even worse threatens life.

### The solution:

#### VdS-approved spark extinguishing systems

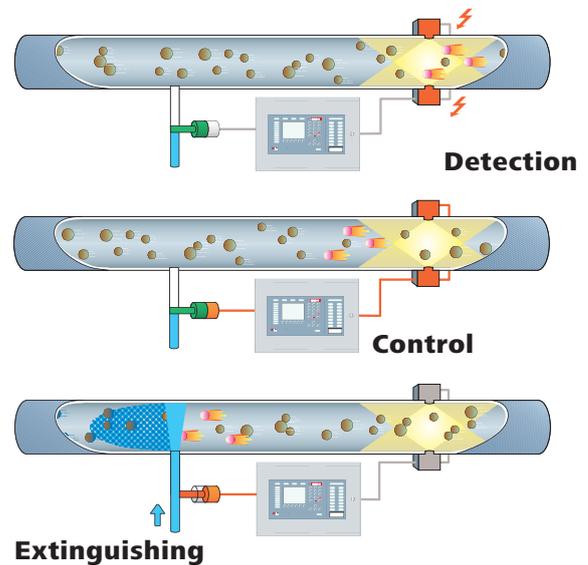
A potential disaster of this magnitude is best handled with preventative measures that are immediate, effective and reliable. With the Minimax system sparks can be detected and extinguished prior to reaching the filter or dust collector thereby protecting all company assets.

Minimax is a pioneer in the development of spark extinguishing systems. Its protection strategy has been successfully tried and tested in thousands of applications worldwide.

### The function

A fully automatic spark extinguishing system (figure) consists of spark detectors, control panel and an automatic extinguishing unit. Sparks travelling through the duct of the conveying system are instantly identified by the infrared spark detectors mounted flush to the wall of the duct.

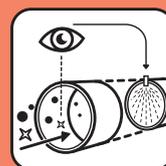
The spark detector sends a signal to the control panel which then triggers the solenoid valve of the automatic extinguishing unit, while simultaneously activating an audible alarm. The extinguishing water is released after milliseconds and injected into



the duct via the strategically placed and patented flat spray nozzles creating a wall of water covering the entire cross section. The glowing particles are conveyed into the water spray curtain. Immediately afterwards the solenoid valve closes automatically. The complete detection and extinguishing process normally operates during production in order to eliminate expensive downtimes. Depending on the amount of potential ignition sources it is also possible to have the conveying machine automatically shut down.



The automatic self-monitoring capabilities of both the spark detector and the automatic extinguishing unit guarantees an outstanding level of operational reliability.



Spark extinguishing systems for pneumatic conveying systems

# QUISHING

## fast and safe

### The advantages

The response time is defined as the time between detection of the spark and the formation of a full spray throughout the entire cross section of the duct. The distance required between the spark detector and the automatic extinguishing unit is dependent on the response time and the system parameters such as velocity, duct diameter and water pressure. With the Minimax reflex module, the flat spray nozzle and the optimised automatic extinguishing unit the response time is significantly reduced in comparison to conventional spark extinguishing systems. By reducing the response time, the distance required between spark detection and the automatic extinguishing unit can also be reduced therefore allowing Minimax to protect even shorter conveying systems. Quick-assembly sets are used for both detectors and extinguishing nozzles to minimize installation times.

### Spark detectors

The highly advanced Minimax infrared detectors are engineered for the immediate identification of sparks in industrial environments. The detector is flush mounted with the inside wall of the duct and responds to the infrared radiation generated by passing sources of heat, i.e., sparks or glowing embers. The detector continuously checks the correct function of its electronics. An additional spark test detector system or special detectors are available to even monitor the visibility. Any faults identified are automatically relayed to the control panel notifying plant personnel. In areas where high ambient temperatures are expected, flexible temperature resistant fibre optic cables are used to thermally separate the electronic components of the spark detector from these hot areas. For conveyor systems which are not completely

enclosed, e.g., conveyor belts, special spark detectors insensitive to daylight can be installed.

### The FMZ 5000 spark detector control panel

This control panel includes a battery backup supply plus a power status indicator and supervises all of the spark detectors, including their function monitoring systems, flow switches, closing devices, pressure booster systems, trace heating, extinguishing valves and spark detector test equipment. As long as sparks are identified, the extinguishment stays activated to prevent a fire damage. One of the three spark counter types, that are available per each spark detector line, offers an averaging over a free-definable period of time. With the help of the spark counters further, stepped measures can be taken in the event of increased or continuous flow of sparks and thus can be used to provide a statistical evaluation of the appearance of sparks in specific areas. The time of every spark detection plus the start and stop of the extinguishing processes, is logged to the millisecond in a storage memory for more than 50,000 entries. The control panel can check the correct functioning of the spark detector and extinguishing components at pre-defined times. Auxiliary relays or an optional bus system can be used to enhance plant safety by allowing automatic equipment shut down. All cable connections are monitored separately for wire breaks and short-circuits. The FMZ 5000 meets the requirements of both: EN 54 Part 2 and 4 for fire detection control panels and EN 12094 Part 1 for the control of gas extinguishing systems. It has been approved by VdS and FM for simultaneous use as a flame detection, fire detection and control panel for all types of extinguishing systems. As a result of this, all fire protection tasks can be carried out with just one control panel.



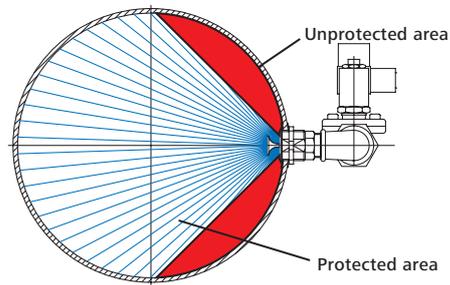
Tested safety:  
Minimax provides VdS-approved  
spark detection systems.



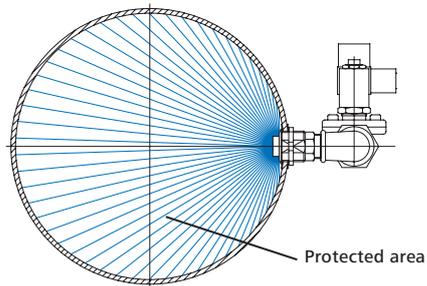
## Automatic extinguishing unit

On receipt of a signal from the spark detector, the control panel activates the quick acting solenoid valve of the automatic extinguishing unit releasing a minimised quantity of extinguishing water. The water is injected by means of the unique flat spray nozzle engineered especially for the conditions in conveying systems. It creates a water spray which covers the entire cross section of the duct. Conventional nozzles, though, can only fill the cross section completely with the help of turbulences in the duct. This requires a certain length of duct. In the installation this means longer necessary distances between the position of nozzles and downstream equipment to be protected. Distances, which are not available very often. In ducts without power venting only gravity is the driving force and, consequently, no turbulences occur. In such chutes, the spray pattern of conventional nozzles will completely fill the section of the duct only if more than one nozzle is installed, whereas with the Minimax flat spray pattern nozzle one nozzle will be sufficient in most of the cases. In Minimax systems, the flow detector is not installed on the water supply, but rather at the automatic extinguishing unit. This allows plant personnel to identify problem zones easily. The stainless steel material and the flush construction of the Minimax flat spray nozzle increase its durability against plugging and abrasion even in the most severe environments. The ball valve as part of the valve unit can also be monitored electronically to ensure that it is always in the correct operating position.

## Section view of the duct at nozzle position: Conventional plate nozzle



## Minimax flat spray nozzle



## Water supply

The Minimax pressure booster system, consisting of a centrifugal pump and a diaphragm pressure vessel, is the most cost effective and efficient means of increasing the water supply pressure if the minimum pressure required cannot be provided by an existing sprinkler system or a service water supply. The diaphragm pressure vessel supplies water with sufficient pressure immediately upon activation of the automatic extinguishing unit. The centrifugal pump automatically supplies the pressure vessel if the water pressure drops below a specified value. Even in the unlikely event of pump failure, several extinguishing impulses from the diaphragm pressure vessel are possible. Optionally a monitoring device is available to detect a broken membrane inside the diaphragm pressure vessel.



Please refer to the Minimax product brochures for more detailed information.

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We reserve the right to make technical changes.