

# Flamex Adapts Its Proven Fire Prevention System to Protect MDF and Chip Board Presses

Imagine a fire or explosion in your plant. If you have to imagine it, and can't remember ever experiencing one, you're lucky, and probably want to keep it that way. Plant damage, lost production time, personal injury and increased insurance premiums are just some of the consequences.

By Ricki Normandin

### Dust Never Sleeps

Industrial operations that generate wood dust and use air filtration systems with pneumatic conveying are particularly susceptible to this kind of incident. Statistics collected by Factory Mutual Research Corporation show that during the 1980s, more than 800 fires and explosions were reported in the woodworking industry, adding up to US\$130 million in loss. Over a ten-year period up to 1995, Allendale, Arkwright, and Protection Mutual Insurance Companies found that 58 dust collector explosions costing a total of US\$14.73 million were fueled by wood dust.

In wood-based manufacturing, even a well-maintained dust collecting system has four of the five elements necessary to start a fire or explosion - fuel, oxygen, dispersion and confinement. All that is needed is ignition, provided by something like a stray spark that gets into the ductwork from a process such as grinding or planing, to set off a fire or explosion in seconds.

### Flamex Keeps Watch

Flamex Inc. of Greensboro, North Carolina, introduced the Flamex Spark Detection and Extinguishing System in 1976 to prevent just such events and their

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*Fire alarm and control panel.*

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associated damage and loss. Improved over the years with new technologies, Flamex has proved its effectiveness in more than a thousand installations in North America alone, protecting woodworking, food, leather, textiles, paper, chemical and metalworking plants.

The proven Flamex concept is based on optical infrared sensors that detect even minute sparks travelling through the airstream. Within a fraction of a second - typically, less than 300 milliseconds - this triggers a solenoid valve and spray nozzles that instantly extinguish the sparks with a minimum amount of water. The spray system can be adapted to utilize other extinguishing agents and the control functions can interface with existing mill safety systems that redirect airflow, shut down process equipment, sound alarms and trigger other safety responses.

### Pressing Dangers

OSHA, (Occupational Safety and Health Administration) cites wood dust as the single greatest hazard for fire and explosion in the particleboard industry. The NFPA, (National Fire Protection Association) also considers it a primary risk and recommends the use of Spark Detection and Extinguishing Systems such as Flamex as part of the prevention and control mechanism.



Contaminated Press Inlet.

However, with the advent of new chip-board and MDF pressing processes, additional combustible materials have been added to the existing wood dust hazard. The fibers, glues, paraffin and lubricating, thermal and hydraulic oils that can collect on hot surfaces during pressing operations pose a significant fire risk. On continuous types of presses, a hot mixture of fiber and glue is exposed to oxygen at the press outlet and can quickly flame up. At the outlet, lubricating oil fog can collect in the upper heat tunnel and go up in flames. In the lower heat tunnel, fiber-glue mixture adhering to the steel belt also poses a major fire risk. At the center of the press, fiber deposits, lubricating oil fog and oil leaks can form a highly combustible mix. Fire at any of these points can quickly spread along the entire line.

CO<sub>2</sub> extinguishing systems effective in protecting machines with similar fire risks have some drawbacks. First, they are most effective in closed spaces and a press is open except for the heat tunnels. Also, large quantities of CO<sub>2</sub> required to extinguish a fire pose major health risks and require evacuation of personnel from the affected area. Thirdly, installing a CO<sub>2</sub> system can require a much greater capital investment than a comparable water spray system.

### A Fine Idea

Flamex has addressed these issues with its Minifog Fine Water Spray System that not only improves on CO<sub>2</sub> but also on conventional water spray systems for protecting chip board and MDF presses.

All water spray extinguishing systems rely on the cooling effects of water. The Minifog system is based on the concept that the finer the spray of water, the more effective the cooling action. The more finely a given amount of water is sprayed, the larger its specific surface, or surface-mass ratio, and the greater the heat transmission contact area. Fine water spray systems with multiple tiny droplets heat up and evaporate the quickest, providing much better cooling performance than traditional water-based systems with large droplets. At the same time, a fine water spray reduces oxygen concentration as it evaporates and expands up to 1600 times and suffocates the fire.

### Press Protection



Impulse nozzle.

This dual action cooling and suffocating effect is the concept behind the Minifog design, which uses open impulse nozzles to produce a full cone spray pattern and even discharge density in the protected zone. The system applied to chip board and MDF presses locates the Minifog nozzles strategically throughout the machine to protect all sections of the press most vulnerable to fire - the outlet, inlet, upper and lower heat tunnels and the press center. The arrangement of the individually directed nozzles is adjusted to the geometry of the protected object as accurately as possible to cover the entire protection zone with a fine water mist. Generally, five extinguishing zones, each with its own deluge valve set, are required to protect the entire press.

Special flame detectors with heat resistant fiber optics placed in each extinguishing zone monitor the machine. In case of fire, the system's detection and extinguishing control panel releases the deluge valves and water flows into the nozzles to extinguish the flames.

Tests of the system during development on a model of a lower press inlet resulted in control of a diesel pool fire within 5 seconds, with total extinguishing of a small residual fire 30 seconds later. Since then, the system has been proven in practice in more than 70 fires on continuous presses around the world.

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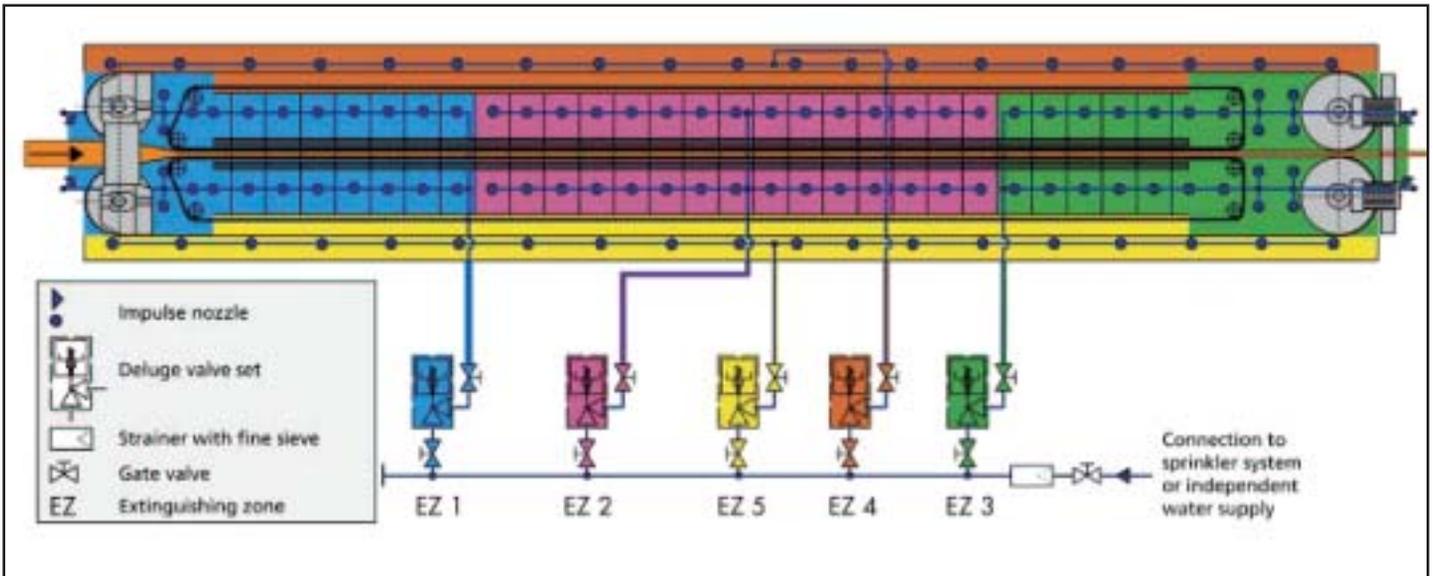


Illustration of extinguishing zones.



Impulse nozzle spraying (numbers in meters).

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### Flamex Prevention Pluses

Flamex systems focus on preventing plant fires and explosions and their costly and destructive consequences. Payback on the cost of the system can be realized in preventing just one such event. Focusing on prevention is far less costly and requires significantly fewer resources than, for example, a sprinkler system designed for a worst case scenario. When activated to do its job, the Flamex system also minimizes clean-up downtime afterwards. Typically, only a few gallons of water are used. Further benefits include increased compliance with fire prevention codes and guidelines possibly resulting in reduced insurance premiums.

Spark or flame detection and extinguishing systems do not eliminate all fire and explosion hazards and should be used in combination with other systems, such as explosion venting and suppression, for more comprehensive protection.

Still, for cost-efficient, effective and flexible protection for dust handling systems and chip board and MDF presses, and increased peace of mind all around, Flamex is hard to beat.

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## Minimax Celebrates 100 Years

Minimax GmbH of Bad Oldesloe, Germany, manufactures the Minifog Fine Water Spray System and Flamex components. The Minimax Company was founded in 1902 and celebrates 100 years of providing professional fire protection systems. These include systems for structural fire protection, fire detection, water extinguishing and foam/powder extinguishing. Minimax also provides services such as fire protection consultation and planning, escape route and rescue plans, fire protection seminars, inspection and repair, fault signal management and full ground coverage service.

Minimax has 23 offices and 27 fire protection centers in Germany and worldwide, with branches and representatives in Europe, Asia, North America and the Middle East.

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