PREVENTIVE PROTECTION SYSTEMS FROM

firefly ab

SWEDEN

Solutions for the Pellet Industry

How to protect a Wood Pellet Manufacturing Process against fires and dust explosions

VdS

FM APPROVED

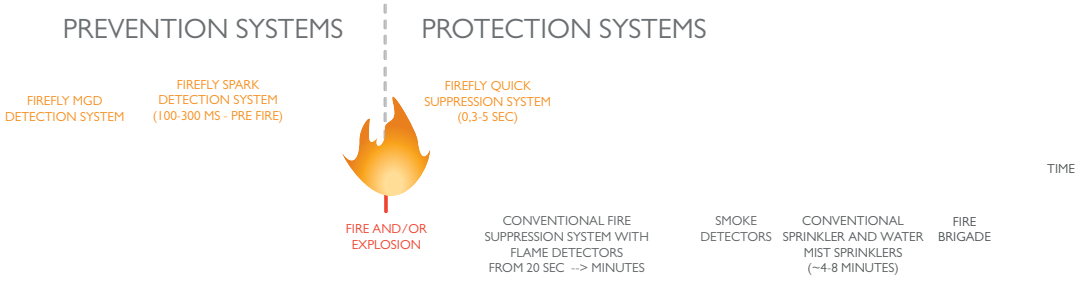
QUALITY SYSTEM CERTIFICATION DNV ISO 9001

Reaching an efficient and safe manufacturing process

A large increase of energy consumption of each EU country should be derived from renewable energy sources, according to EU directives. This places heavy demands on the energy sector and has resulted in increased conversion from fossil fuels to biofuels. This development can also be seen in many other parts of the world. As the bioenergy industry grows, so does its fire problem.

There are several high-risk zones in which fires or dust explosions may arise. By monitoring and protecting these high-risk zones through an appropriate fire prevention or fire protection system, with a quick response time, fires can be prevented before damages have occurred and before spreading into other areas.

Firefly offers a wide range of solutions for both fire prevention and protection in these high-risk areas.



"Hot particles can be generated from surfaces that have been heated by friction. A hot particle even the size of a pea may pose a much greater risk than a spark. Even if the temperature of the hot particle is lower than that of a spark, the hot particle will remain dangerous for a longer time."

Professor Rolf K. Eckhoff,

Author of "Dust explosions in the process industries"

Ignition temperatures & energies

Many fire problems in the pellet industry are caused by friction. The friction itself does not generate sparks, but causes hot surfaces and heated material. If the temperature reaches above the MIT (Minimum Ignition Temperature) of the wood dust, an ignition could occur.

If you extinguish a match, its temperature will be around 470°C / 800°F. This is about the same temperature that is needed to ignite whirling wood dust, which exists in a filter for example. Layers of wood dust, which exist in a pellet silo, can ignite at even lower temperatures at ~ 260°C / 500°F. Firefly detectors can detect sparks and hot particles down to 250°C /480°F.

Research* clearly shows that (black) hot particles are more frequent sources of ignition within the process industry than expected. Therefore Firefly has developed a unique and patented technology based on Infrared (IR) radiation detection, which makes it possible to detect and eliminate both sparks and hot particles with temperatures down to 250°C / 480°F.

Minimum ignition temperature and energy level

	CLOUD °C	CLOUD °F	LAYER °C	LAYER °F	CLOUD, MIN. IGNITION ENERGY, J
WOOD	470	878	260	500	0,04

Source: NFPA (National Fire Protection Association)

* Prof. Rolf K. Eckhoff, author of "Dust explosions in the process industries" (second edition)

FM APPROVED

Firefly is the only company in the world with FM approval for spark detectors detecting hot black particles from 250°C and 400°C.

As the first company in the world Firefly launched a third party certified Quick Suppression System.

Unique Solutions for Increased Safety

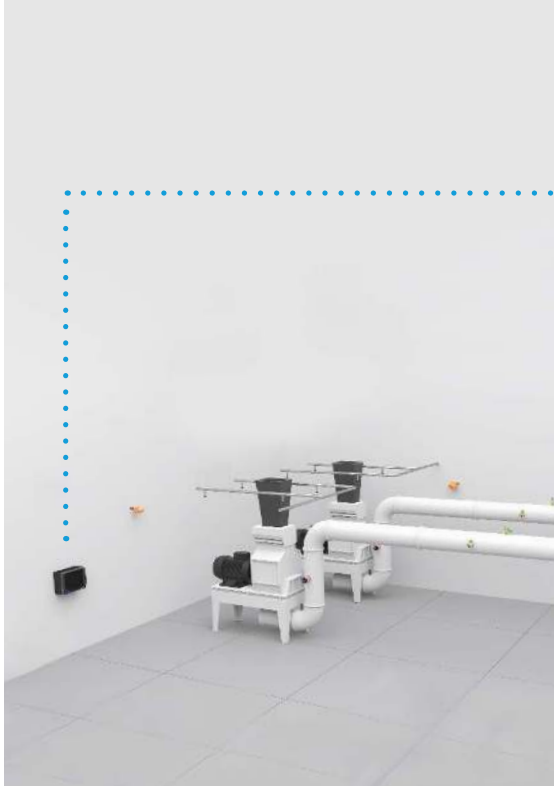
Firefly's unique solutions for a wood pellet manufacturing plant combines preventive and protective systems for increased safety, all integrated into one control system.

Fire Prevention

Firefly's Spark Detection System can, in milliseconds, detect and extinguish ignition sources inside the process, before they cause fire or dust explosion. It is based on Firefly's unique True IR spark detectors, designed to detect ALL dangerous ignition sources such as sparks, hot (black) particles and flames. Firefly's True IR detectors are insensitive to daylight thus minimizing the risk of false positives.

Fire Protection

Volumes in the process or risk zones that occurs outside the process, e.g belt dryers, around mills, around pellet presses etc, can be efficiently protected by Firefly's Quick Suppression System. This system is designed for extremely fast detection and suppression of flames and fires in and around critical machinery. It operates with high performance flame detectors and efficient water mist suppression nozzles. The purpose of the Quick Suppression System is to detect and extinguish a fire quick enough to avoid or significantly reduce damages.



Firefly EXIMIO™ – Intelligent System Architecture

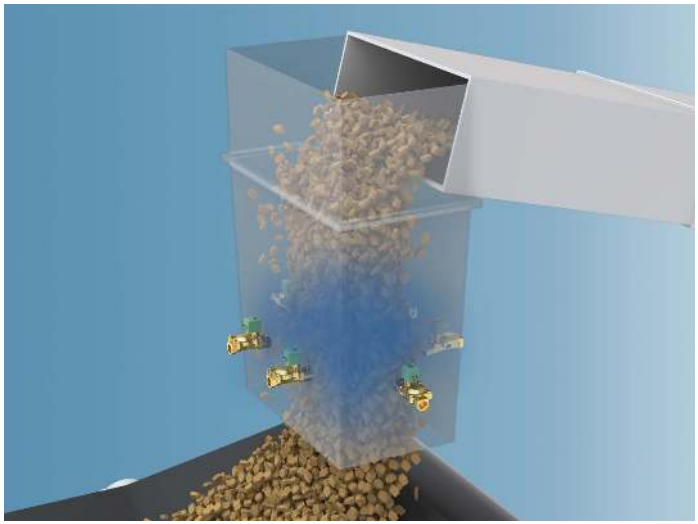
Firefly EXIMIO™ is an intelligent system with a decentralized and modular system architecture. Detectors and extinguishing equipment are connected to local hubs, making cabling and installation easy. It is also easy to extend the system for future needs.

Operators will control the system via a color touch screen with an IntuVision™ - operators interface, that comes as standard in every Firefly EXIMIO™ System. IntuVision™ is easy to use and includes lots of features and functions, for example ApplicationView™ where a drawing of the zone will be shown on the screen. By using IntuVision™ - Desktop, the customer can even connect the system to an external computer, for example in the control room.

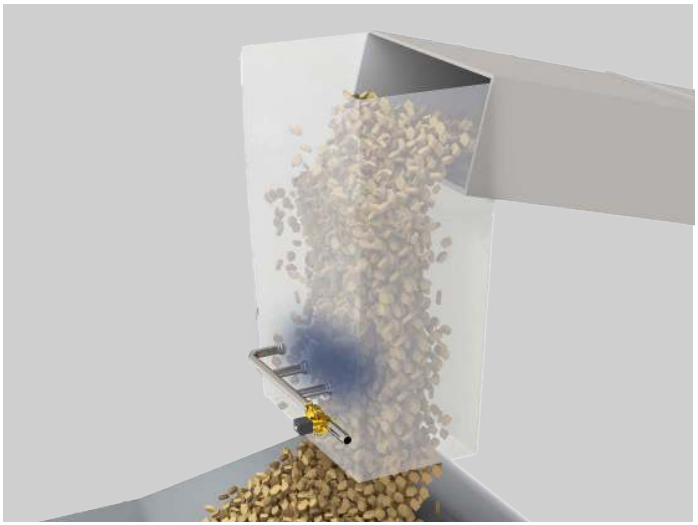
The Firefly EXIMIO™ System can be connected via an Ethernet cable or a modem to enable remote help and service.

"We are using Firefly starting with the first plant 2013, and today Firefly is protecting all of our three pellets plants. Firefly's Spark Detection System is protecting the complete process and our belt dryers have flame detection and water mist. The system has saved us from a real disaster when hot particles came inside the dryer from probably a truck and Firefly detected and extinguished the hot particles which were falling from the belt before it started a fire. Reliable detections of the system gives us real safety and we always find the cause of detection when Firefly stops the process. Nowadays we cannot run the production without Firefly."

Vladimir Aspednikov
Production Manager
Pellet plant Lesozadod 25 in Russia



FIREFLY EXTINGUSHING SYSTEM



CONVENTIONAL EXTINGUSHING SYSTEM

Powerful extinguishing with full-cone water spray

The pellet industry handles large amounts of material; from hundreds of kilos up to several tons per hour. High flows of compact material demand a powerful extinguishing which is able to penetrate large production flows.

Conventional extinguishing systems use hollow-cone spray nozzles with relatively small water droplets, often installed only from one direction. Consequently, conventional extinguishing provides less ability to penetrate the entire material flow and can leave uncovered areas inside a pneumatic conveying system or chute.

Firefly provides high-speed and powerful full-cone extinguishing with a unique nozzle design and placement from different directions aimed to penetrate and cover the entire material flow inside a pneumatic conveying system or chute. Firefly's full-cone extinguishing activates within milliseconds after detection and avoid unnecessary water usage.

Firefly PowerImpact Extinguishing™

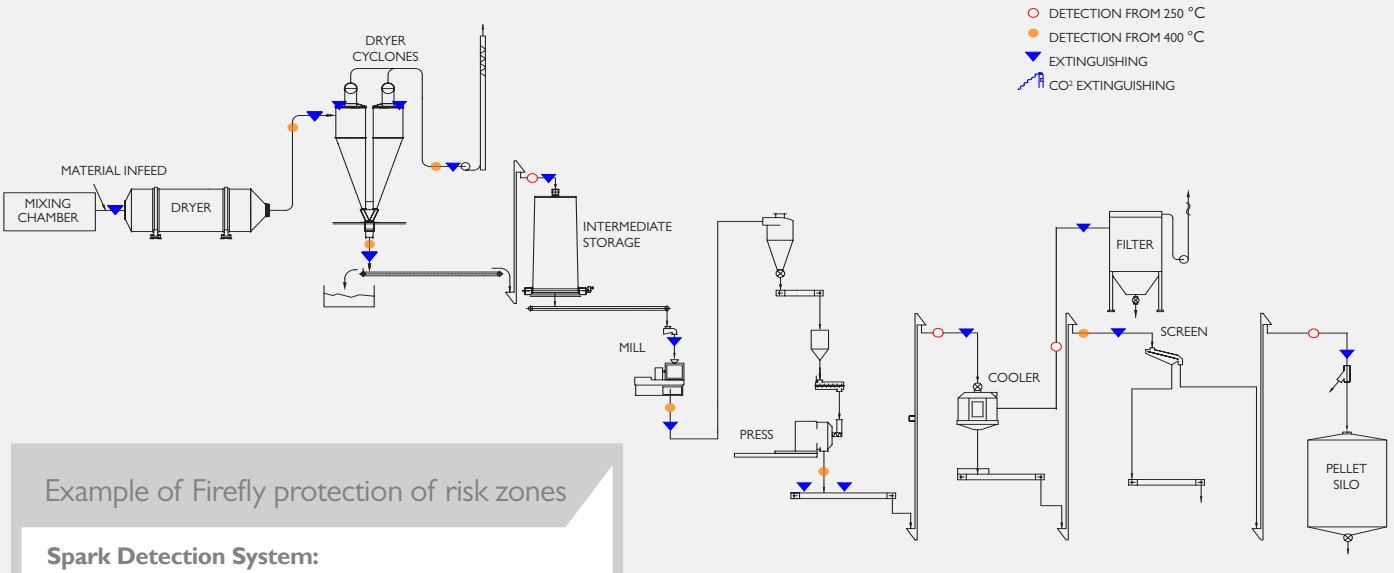
Efficient for extinguishing/cooling of ignition sources in a material flow

Full-cone water spray nozzles

Thoroughly penetrates dense material flow

Activated within milliseconds after detection

Short extinguishing cycles that avoids unnecessary water usage



Example of Firefly protection of risk zones

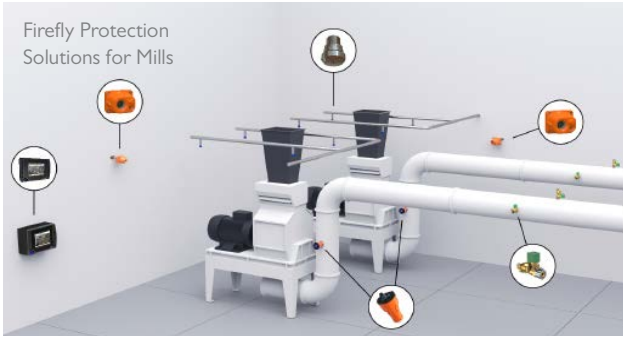
Spark Detection System:
Dryer, Mills, Pellet Press, Elevator, Cooler, Filter, Storage Silo

Quick Suppression System:
Belt Dryer, Around mills, Around Pellet Presses

Protection of a Pellet Production Line

The design of a pellet manufacturing processes can be very different depending on machine types and technologies used. Hence, the risks must be evaluated and the solutions must be designed specifically for each process.

In a pellet manufacturing process there are some risk zones that are overrepresented when it comes to fire or explosion incidents and these are especially important to protect.



Patented True IR detectors
Millisecond detection of hot particles, sparks and flames. Firefly's spark detectors are FM approved and insensitive to daylight.

Full-cone water spray extinguishing
Powerful extinguishing with a unique nozzle design and placement aimed to penetrate and cover the entire material flow. Activated within milliseconds after detection.

Firefly Flame detectors
Fast-acting flame detectors, highly immune to external disturbances and designed to withstand tough industrial environments. Firefly Flame detectors are FM approved.

Water Mist Suppression
Firefly water mist suppression is efficient for suppression of flames in machines or in open areas with minimal water usage and quick reaction time.

A Unified Control System
Systems are integrated into one system platform which is operated through a control panel with a touch screen. This enables a good overview of all protected zones.

Protection of Filters and Silos

Filter Protection

Dust extraction systems in filters are vital to take care of dust. By limiting the amount of dust, the environment will be improved and the fire risks in material handling areas can be reduced.

However, by controlling the dust emissions, new risk zones are created, such as filters/dust collectors. The risk in these units is considered very high due to the high concentration of dust, thereof the importance of implementing an appropriate spark detection system.

Silo Protection

Fires in silos are considered a worst case scenario. A silo fire can be started by ignition sources entering the silo, by mechanical failure inside the silo or by self ignition of the material stored in the silo.

Patented True IR detectors

Millisecond detection of hot particles, sparks and flames. Firefly's spark detectors are FM approved and insensitive to daylight.

Full-cone water spray extinguishing

Powerful extinguishing with a unique nozzle design and placement aimed to penetrate and cover the entire material flow. Activated within milliseconds after detection.

MGD Detector

Firefly's MGD, a gas analyzer, commonly known as "electronic nose", is designed to detect the earliest stages of a combustion process, for example the self-heating process of an organic material. The MGD can be installed in the top of the silo or at the outlet tunnel from the silo to give an early warning of a combustion process inside the silo.

Intelligent fire prevention and protection systems

Spark Detection System - Fire prevention

Precision Detection

True IR spark detectors enable precision detection of ALL types of ignition sources, such as hot black particles, glowing embers and sparks.

Not Daylight Sensitive

Not sensitive to daylight and minimized false positives.

Power Impact Extinguishing

Powerful extinguishing that will penetrate large material flows.

Quick Suppression System - Fire protection

Quick System Response Time

Limited damages and minimized production loss thanks to an extremely quick system response time.

State-of-The-Art Detectors

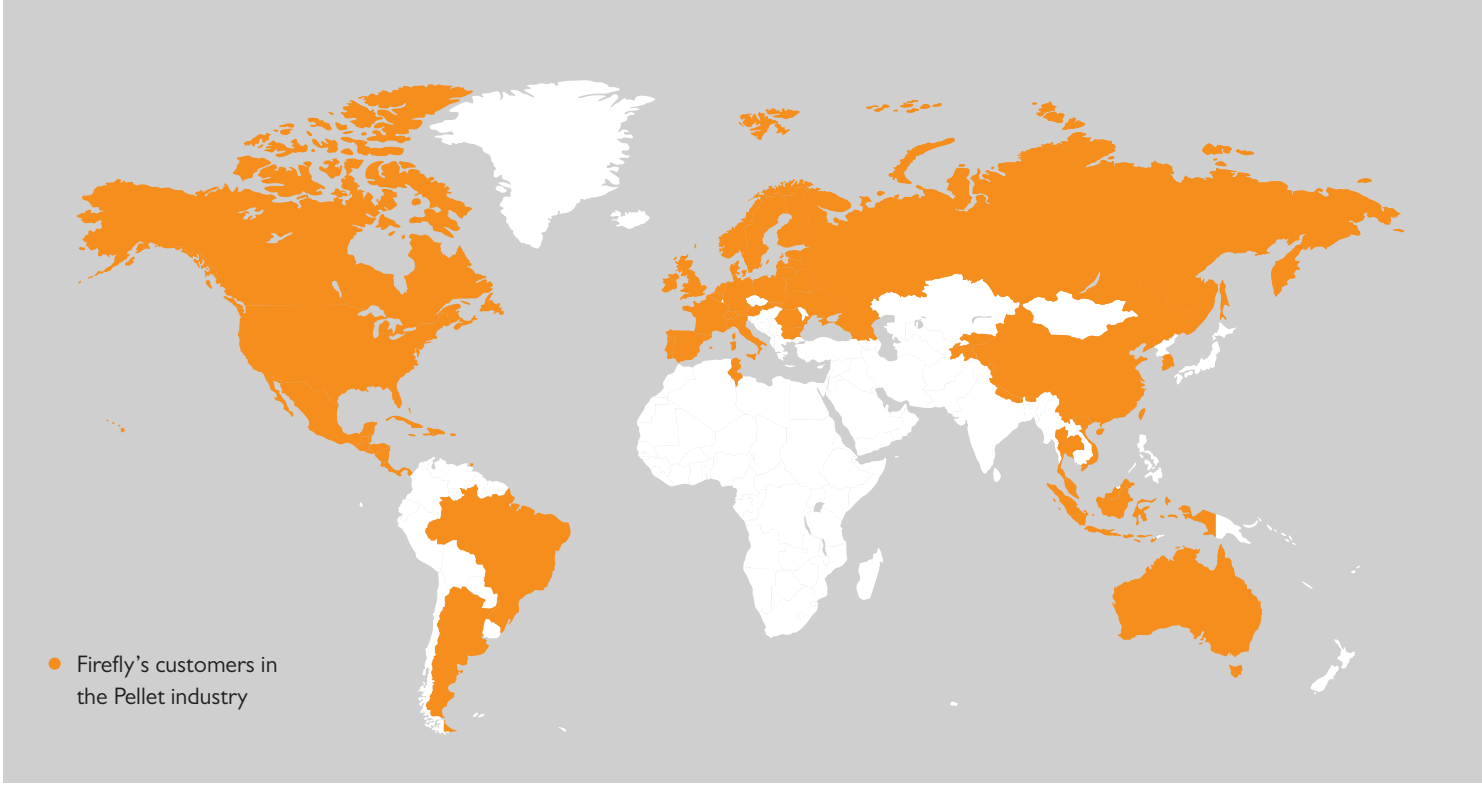
Designed for rough and dirty environments.

Minimal Water Usage

Water Mist System with fire-tested and verified extinguishing capabilities, utilizes very small amounts of water resulting in less impact on machinery.

A Unified Control System

The control panel enable a good overview of all protected zones. Operators control the system through IntuVision™, an intuitive user interface with a colour touch screen, which is standard in every Firefly System.



Firefly worldwide

The access of reliable and renewable energy is a prerequisite for meeting several of the challenges the world is facing today. As the need for bioenergy increases worldwide, the number of Firefly's Fire Prevention and Protection Systems is growing rapidly in the bioenergy industry all over the world.

A few of our customers in the Pellet Industry:

Futerra, Södra, Pelletsfirst, Rainbow Pellet, Westervelt Pellets I Uju Vina Company LTD, Lesozavod 25, Georgia Biomass, Vapo Group, Stora Enso, Gesfinu Group, Granula Invest, Arapellet, Glowood

As a Firefly customer you recieve:

Third Party Approved System

Increased safety through fire tested and third party approved fire prevention and protection systems custom made and optimized for your specific process.

Local Presence and Know-How

Since 1973, Firefly has gathered a vast experience within industrial processes over the years. We provide local expertise all over the world.

A Dedicated Partner

We strive to provide excellent service in everything we do and we measure regularly customer satisfaction.

Proactive Service

In order to optimize your fire protection system we offer proactive service visits. With Firefly you will get an extensive system life cycle with availability of spare parts.

About Firefly

Firefly is a Swedish company that provides industrial fire prevention and protection systems to the process industry worldwide. Since 1973, Firefly has specialized in creating customized system solutions of the highest technical standards and quality. Based on customer needs and research Firefly has developed and patented products and solutions, creating a unique portfolio of innovative products and system solutions to increase the level of safety.

The company is noted on the OMX/NASDAQ First North Exchange in Stockholm, Sweden and holds national and international approvals on its products. In complement to worldwide sales, Firefly also provides its customers with field service, maintenance and a guaranteed long-term spare part supply.

The Firefly quality management system is certified according to ISO 9001 and EN ISO/IEC 80079-34. Firefly's products hold national and international third party certifications through FM, VdS, CSA, DNV, LCIE Bureau Veritas, Delta and RISE among others.

For more information on our certifications and approvals
please visit: www.firefly.se/en/company/approvals

Do you have a question about the fire and explosion risk in your plant?
Contact us, we are happy to assist you with our knowledge and experience.

Firefly - Keeps you in production

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