Solutions for the Pellet Industry

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

FM APPROVED

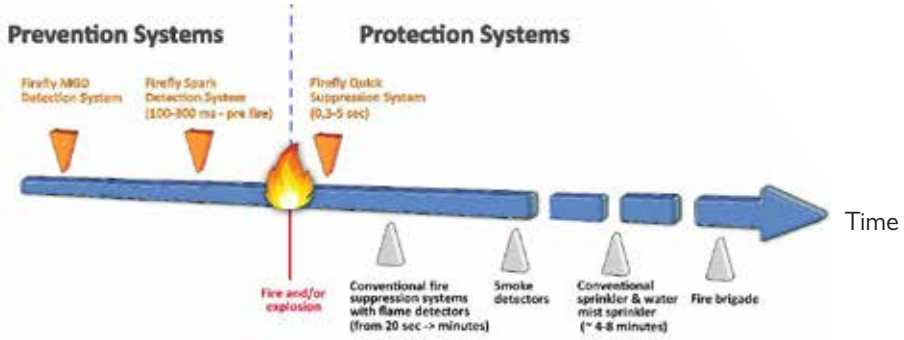
VdS

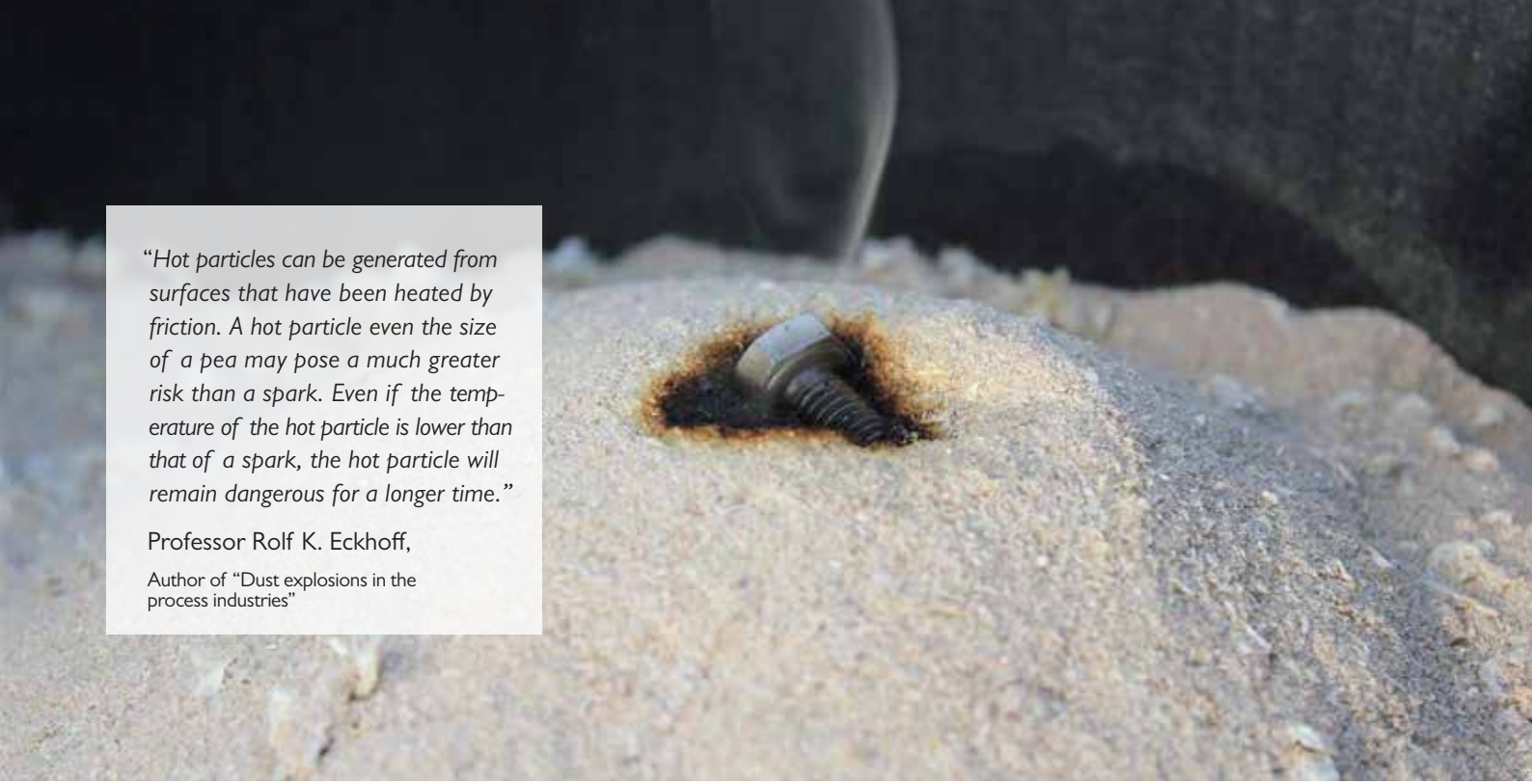
QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

Reaching an efficient and safe manufacturing process

By 2030, over 30 percent of the 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 and 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 detects 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		LAYER		MIN. CLOUD IGNITION ENERGY, J
	°C	°F	°C	°F	
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)

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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 Optimal Safety

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

Fire Prevention

Firefly's Spark Detection System will, 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.

"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

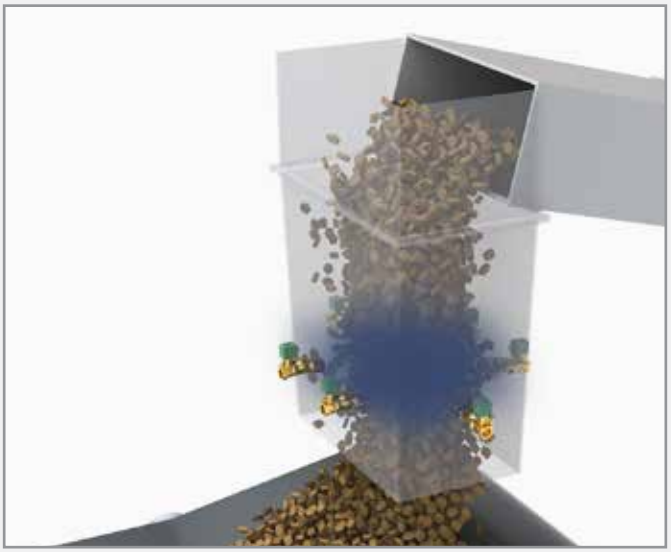
Firefly EXIMIO™

EXIMIO™ – Intelligent System Architecture

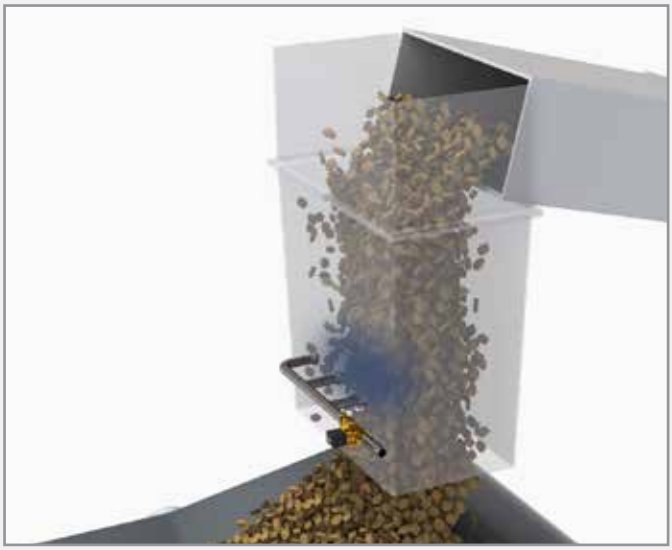
Firefly EXIMIO™ is an intelligent system with a decentralized and modular system architecture. Detectors and extinguishing equipment is connected to local hubs, making cabling and installation easy. It is also easy to extend the system for future needs.

Operators will control the system via a colour 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 Eximio™ System can be connected via an Ethernet cable or a modem, to enable remote help and service.



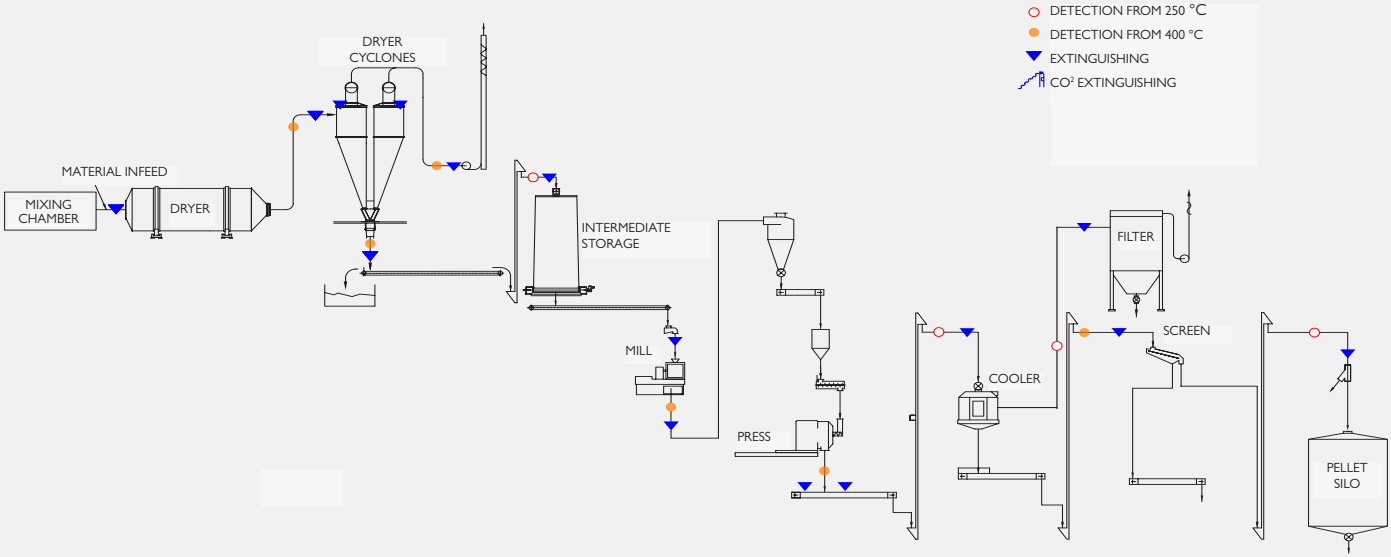
FIREFLY EXTINGUSHING SYSTEM



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. Firefly provides powerful extinguishing using full-cone water spray as opposed to conventional systems with extinguishing using small water droplets divided in the periphery.



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.

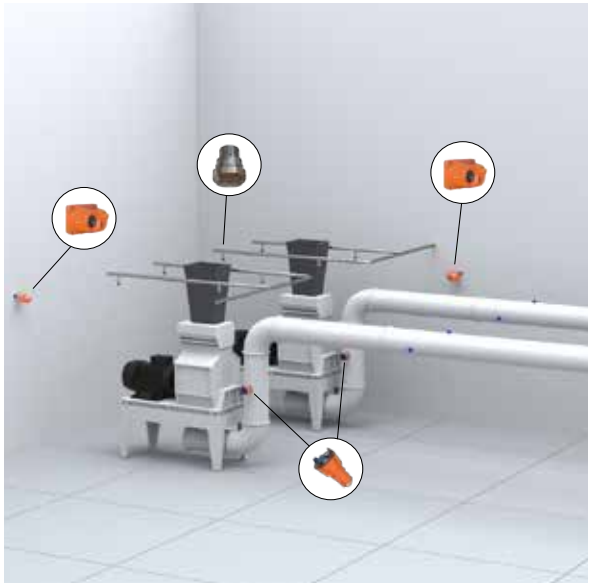
Example of Risk Zones to be protected with Firefly in:

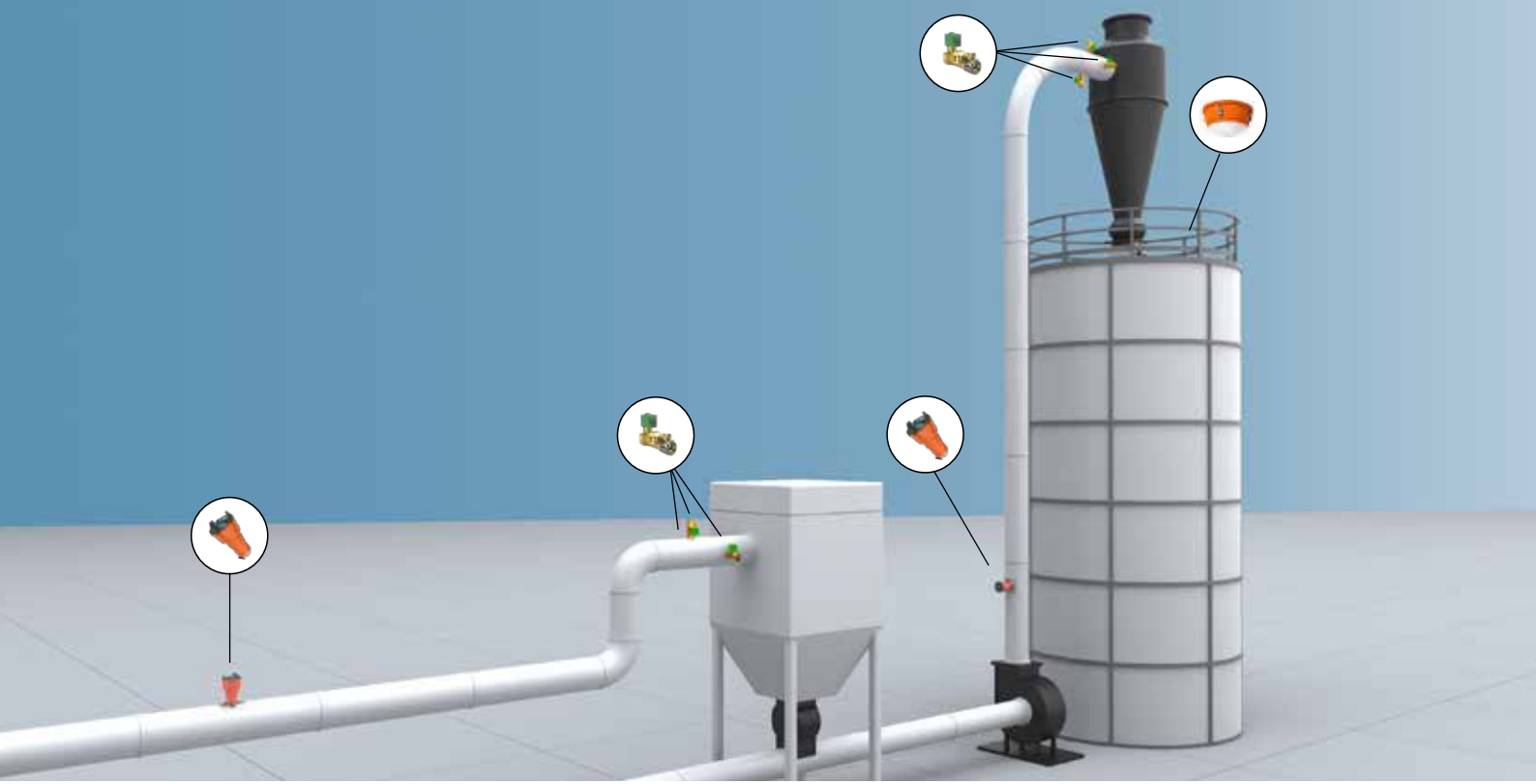
Spark Detection System:

Dryer, Storage bin/hopper, Mill, Pellet Press, Elevator, Cooler, Filter, Storage Silo

Quick Suppression System:

Storage Area, Belt Dryer, Mill Room, Around Pellet Presses





Protection of Filters and Silos

Firefly Filter Protection

Dust extraction systems are vital to take care of dust generated in dry bulk handling processes. By limiting the amount of dust, the environment will be improved and the fire risks in bulk 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, there of the importance of implementing an appropriate spark detection system.

Firefly's, FM-approved Spark Detection and Extinguishing System will efficiently prevent ignition sources from entering the risk zones. Thus, avoiding the start of a fire or a dust explosion inside the risk zone.

Firefly 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.

Firefly's True-IR detectors will prevent ignition sources (such as hot black particles, embers and sparks) from entering the silo. Full-cone water spray is one of the methods used to extinguish the ignition source in milliseconds after detection.

The detection of a smouldering fire inside a silo is known to be very difficult. 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 protective 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 – minimized false positives.

Power Impact Extinguishing
Powerful extinguishing that will penetrate large material flows.

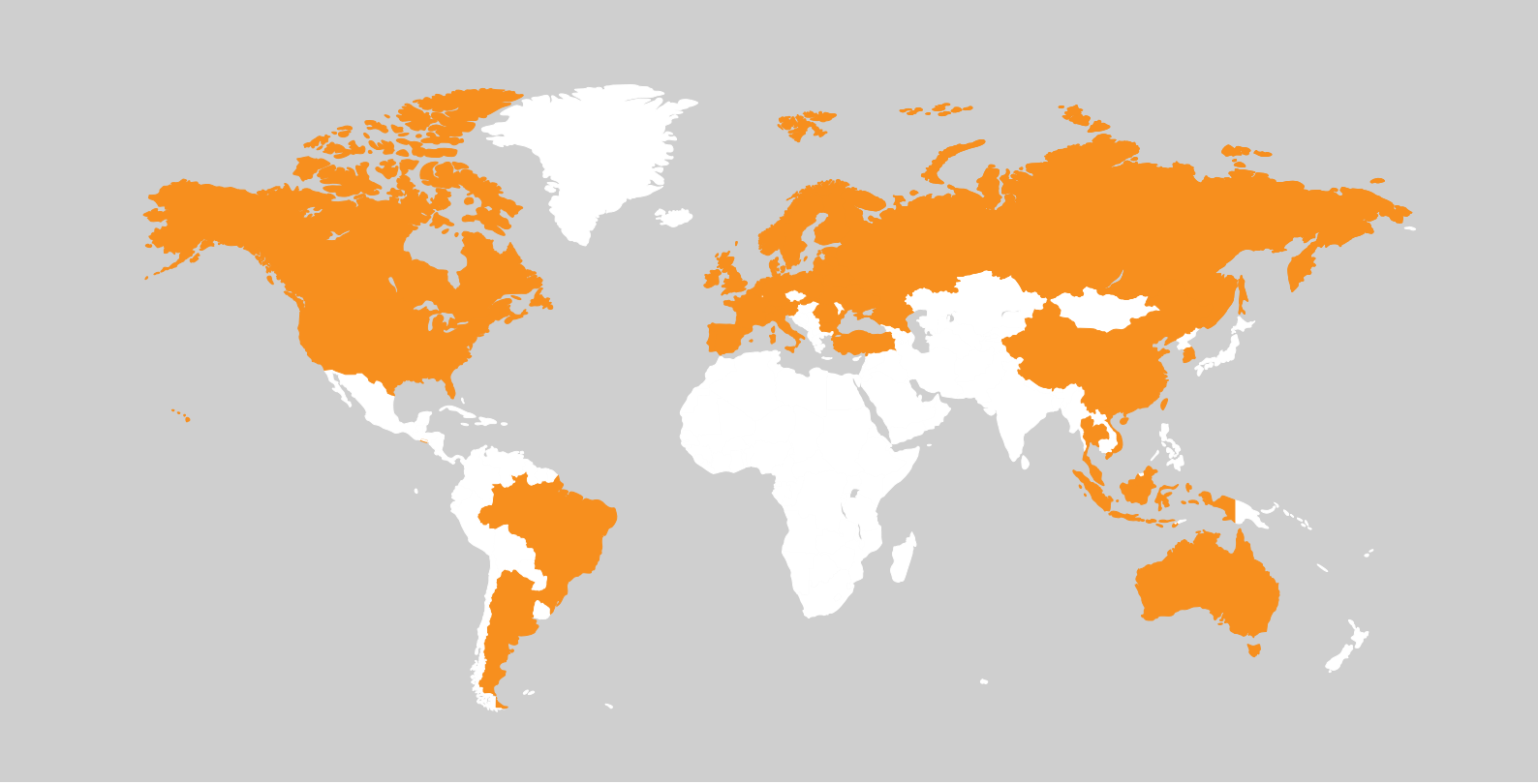
Quick Suppression System - Fire protection

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 environment.

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
Firefly´s Spark Detection System and Quick Suppression System are based on the same system architecture and can be controlled by the same Control panel, enabling a good overview of all protected zones. Operators will control the system via IntuVision™, an intuitive user interface with a colour touch screen, which comes as a standard in every Firefly System.



As a Firefly costumer 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 a vast experience within different 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.

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.

We protect:

Futerra, Södra, Pelletsfirst, Rainbow Pellet, Westervelt Pellets I

Uju Vina Company LTD, Lesozavod 25, Georgia Biomass, Vapo Oy

Stora Enso, Gesfinu Group, Granula Invest, Arapellet, Glowood

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-GL, 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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