PREVENTIVE PROTECTION SYSTEMS FROM
firefly ab
SWEDEN

FM APPROVED

VdS

Selecting the appropriate detection technology

to avoid combustible dust fires & explosions

Firefly - Keeps you in production

SELECTING THE APPROPRIATE DETECTION TECHNOLOGY BASED ON INDUSTRIES' BEST PRACTICES

	Firefly PbS detector	Other supplier Si detector	Other supplier PbS detector
FM-approved* to detect particles above 700°C (sparks, glowing embers)	✓	✓	✓
FM-approved to detect particles down to 400°C (sparks, glowing embers AND dark particles)	✓		
FM-approved to detect particles down to 250°C (sparks, glowing embers AND dark particles)	✓		
Insensitive to daylight	✓		
View angle 110°	✓	✓	✓
View angle 180°	✓		
FM approved	✓	✓	
VdS approved	✓	✓	✓
Robust aluminum housing designed for heavy-duty industrial environments	✓		

Firefly is the only spark detection company that offers one single True IR-detector that is designed to detect all dangerous dark/black particles as well as all dangerous sparks and glowing embers for each unique application.

*www.fmapprovals.com

Ignition Source (Spark) Detectors

Si = Silicon photodiode

- Used in conventional spark detectors

PbS = Lead sulphide

- Used in Firefly True IR detectors combined with patented technology and utilizes advanced signal processing by ***derivation***
- Used in conventional IR detectors without patent and utilizes basic signal processing by ***integration****

****PbS detectors using signal processing by integration (other suppliers) can cause false positives due to changes in material temperature and background radiation. These detectors are therefore equipped with a manual sensitivity adjustment allowing the user to suppress false positives by lowering the sensitivity. This can result in an inability to detect competent ignition sources even at lower velocities.***

Why is a Si detector unable to detect particles with temperatures below 700°C?
The spectral range of the Si detector (0.8-1.1 µm) results in a limited capability of detecting lower temperatures and a high sensitivity to daylight.

The Si detector has a measurement temperature limit from 600°C, as specified by ***Hamamatsu Photonics*** (the world's largest supplier of silicon photodiodes).

Root Cause of Combustible Dust Fires & Explosions

Different combustible materials have different minimum ignition temperatures (MIT) and different minimum ignition energies (MIE). Only when both the MIT and the MIE levels are met or exceeded, ignition of the material can take place. Consequently, to be considered adequate, a spark detection system should detect ignition sources at these levels.

MINIMUM IGNITION TEMPERATURE AND ENERGY LEVEL

	CLOUD		LAYER		MIN. CLOUD IGNITION ENERGY, J
	°C	°F	°C	°F	
WOOD	470	878	260	500	0,04
WHEAT FLOUR	440	824	440	824	0,06
CELLULOSE	480	896	270	518	0,08
SUGAR	370	698	400	608	0,03
COCOA	510	950	240	464	0,10
ALUMINUM	610	1130	326	619	0,01
COFFEE	720	1328	270	518	0,16

Source: NFPA (National Fire Protection Association)

NFPA – Definition of a spark

Spark: "A moving particle of solid material that emits radiant energy due to either its temperature or the process of combustion on its surface."
(ref. General requirements, art. 3.3.27)

This definition of a spark is often misinterpreted. In this NFPA definition, the term 'spark' equals 'ignition source': a particle that could be black ('...due to its temperature...') or glow ('...due to combustion on its surface.').

Firefly – Inventor and patent owner of TrueDetect™ technology

TrueDetect™ technology

Firefly's True IR detectors are insensitive to daylight and designed to detect all dangerous ignition sources such as sparks, hot (dark) particles and flames in both drop chutes and pneumatic conveying systems.

Multi-checkpoint technology™

As the only supplier in the world, Firefly equips all its True IR detectors with the patented Multi-checkpoint technology™ to ensure detection quickness and reliability. Using a derivative measuring principle, Firefly True IR detectors can detect dangerous particles at transport speeds up to 50m/sec.

View angle

As the only supplier in the world, Firefly True IR detectors have a 180° view angle to ensure coverage of the entire volume inside a pneumatic duct or fall chute.

FINAL NOTE

Make sure to always check final proposals from spark detection suppliers to review which detector type(s) will be installed at which locations.

PREVENTIVE PROTECTION SYSTEMS FROM
firefly ab
SWEDEN
www.firefly.se