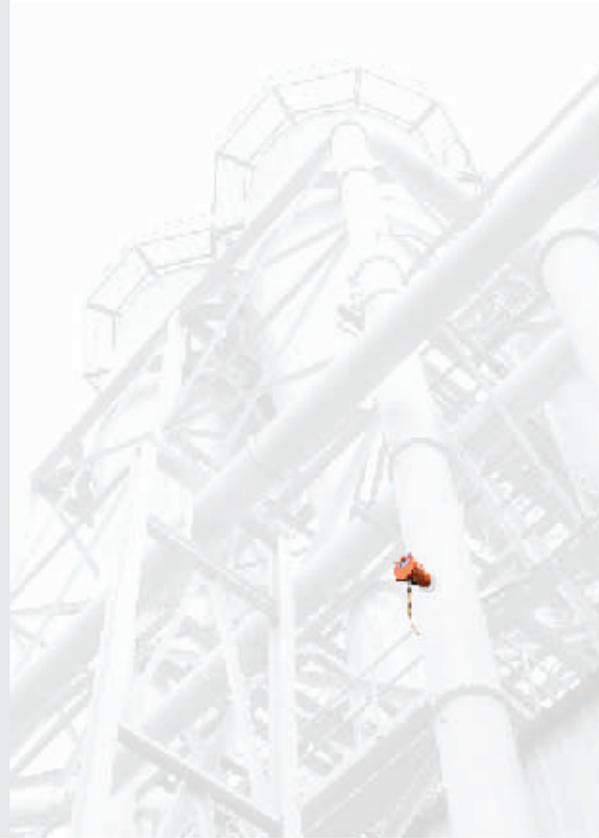


DETECTION



Detection down to the right temperature...

The detector is of vital importance in a preventative protection system. Firefly has a unique position in the market for detecting ignition sources in different applications. The Firefly technology detects dangerous particles, flames and are designed to minimise the risk of false alarms.

All fires and dust explosions have an ignition sequence. An effective means of protection is to neutralize the small amounts of energy (ignition sources) before they manage to ignite the fine particles.

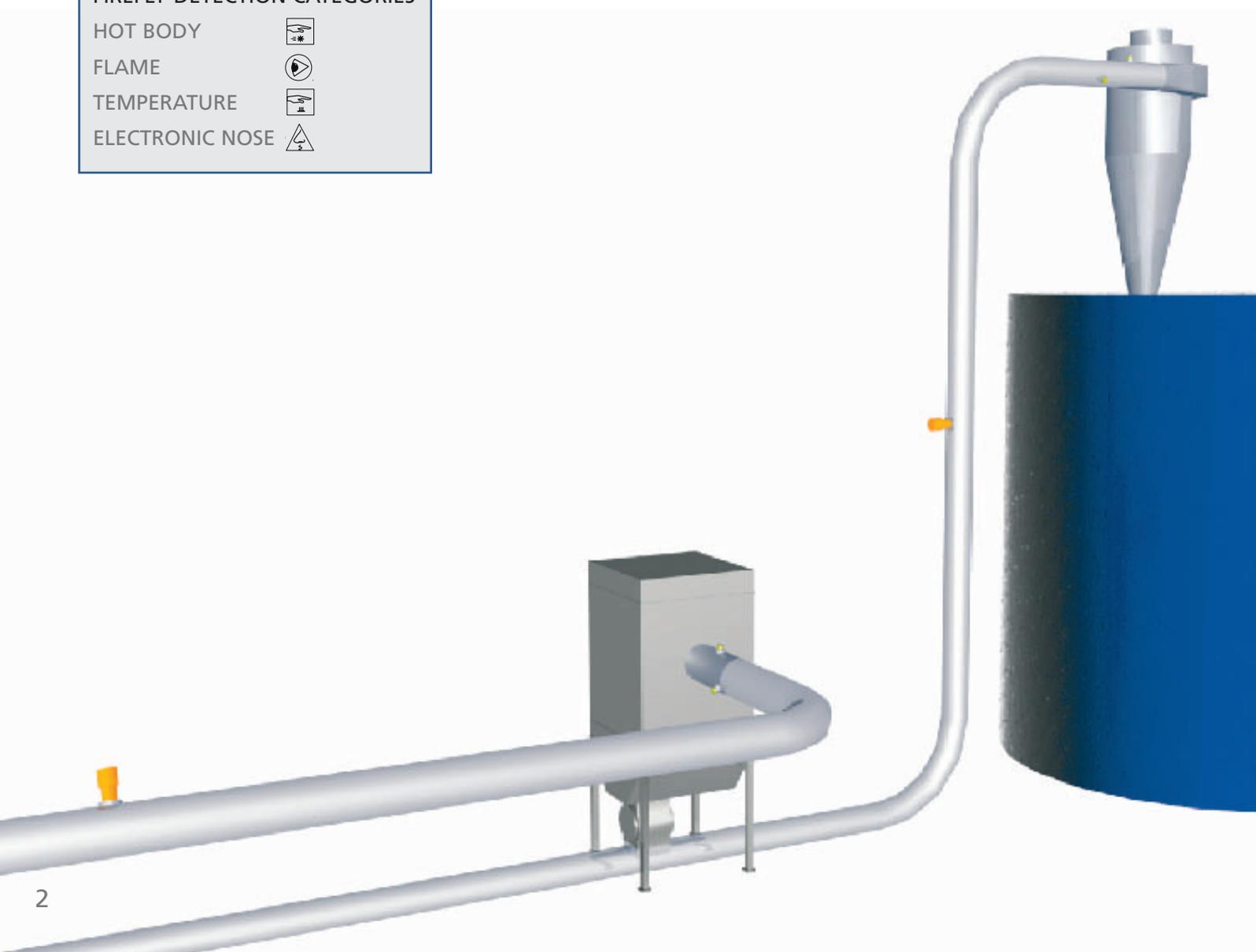
One of the most important component in the Firefly system is the unique worldwide patented infrared (IR) detector, which reacts to temperatures as low as 130° C. Conventional detectors available on the market are incapable of detecting particles at temperatures below 700° C. They are therefore ineffective in detecting low temperature ignition sources.

When material is stored in silos, bins and fuel deposits the minimal ignition temperature drops rapidly. Wood dust for example ignites in a dust cloud at 480° C, but as soon as the wood dust is in a layer the ignition temperature drops down to about 260° C. Therefore it is essential to determine the ignition temperature in a process to be able to custom design a preventive protection system.

| MINIMUM IGNITION TEMPERATURES | | |
|-------------------------------|--------|--------|
| | CLOUD | LAYER |
| COCOA | 580° C | 460° C |
| PAPER | 580° C | 360° C |
| COTTON | 560° C | 350° C |
| CHARCOAL | 520° C | 270° C |
| CELLULOSE | 500° C | 380° C |
| WOOD | 480° C | 260° C |
| TOBACCO | 470° C | 280° C |
| PEAT | 470° C | 320° C |
| COFFEE | 460° C | 450° C |

Source:
Dust explosions in the process industries, second edition.
Rolf K Eckhoff

| FIREFLY DETECTION CATEGORIES | |
|------------------------------|---|
| HOT BODY |  |
| FLAME |  |
| TEMPERATURE |  |
| ELECTRONIC NOSE |  |



FIREFLY HOT BODY DETECTORS

These detectors indicate hot particles, sparks and flames in a process where the material is moving such as in pneumatic conveying ducts or chutes. The detectors are infrared-sensitive, measuring radiated energy and having multi-zone detection with a high degree of reliability. This unique principal of energy measure-

ment confirms the risk of the ignition source. All detectors are equipped with the Firefly self diagnostic function. This means that internal sensitivities, humidity and temperature in the electronics etc. are checked automatically, every minute.

400° C

The GD 400 detector can be used for monitoring pneumatic conveyer systems and chutes. For protection of risk zones where material occurs in dust clouds, e.g. filters.



250° C

The TD 250 detector can be used for monitoring pneumatic conveyer systems and chutes. For protection of risk zones where material occurs in layers, e.g. storage silos.



130° C

The LD 130 detector can be used for monitoring pneumatic conveyer systems and chutes. For protection of risk zones containing material with very low ignition temperature.



HOT BODY | FLAME | TEMPERATURE | ELECTRONIC NOSE

FIREFLY FLAME DETECTORS

UV/IR

The OAD detects flames in open areas. It registers the ultraviolet and infrared light emitted from the flames that arise when organic material burns, such as wood and oil. By using Fire Event Analysis (FEA) discrimination technology the sensor can efficiently distinguish between radiation from irrelevant light sources and radiation from hazardous flames. The detector has an extremely rapid microchip, which ensures that irrelevant light sources never initiate an extinguishing action. Built in self-diagnostic means that internal sensitivities, humidity and temperature in the electronics etc. are checked automatically, every minute. Similarly the status of the OAD detector glasses will also be checked and an alarm message is given if it is covered with dust. The OAD detector is typically used for monitoring open areas adjacent to production machines.



IR

The FD detector is designed for flame detection in small and medium sized volumes. The detector is infrared sensitive with an extremely fast response time with energy measurement using triple signal verification ensuring a high degree of reliability. The FD detector is typically used to monitor enclosed volumes where fast response time is critical.



FIREFLY TEMPERATURE GRADIENT DETECTOR

TG

The TG detector reacts to unplanned temperature changes in a production process. It is temperature sensitive and can be preset at a number of alarm levels for different temperatures and temperature transients. Thus the alarm can be escalated to different levels for maximum security and minimum downtime.

The TG detector is used to monitor rapid temperature changes.



HOT BODY | FLAME | TEMPERATURE | ELECTRONIC NOSE

FIREFLY ELECTRONIC NOSE TECHNOLOGY

MGD

The human nose has proven to be an excellent »fire detector«. In many cases a person has been able to smell the problem long before indication from any automatic system. Based on this concept Firefly has developed an electronic copy of a human nose, able to determine what is actually just a smell and what is a smouldering fire.

The MGD detector is used to indicate fire and emissions from hazardous substances. It is designed specifically for installation into industrial plants, storage facilities, ships and public areas including airports, railway stations, subways, theatres and shopping centres.

The device registers a wide range of gas emissions and can thus respond to changes in the chemical composition of indoor air at an early stage due to the development of fire or other hazardous situations. These signatures are assessed by using an intelligent data analysis.

The system detects the origin of the hazard or type of the fire and triggers the warning. The prompt and positive identification of the origin of the fire or hazardous situation is the prerequisite of efficient management of the situation.

The device reduces the probability of false alarms considerably.

