ETG
Risorse e Tecnologia

Silo SafeGuard 2.0

A reliable system to prevent fire and explosion in dust coal,cereal silos,bunkers

Key features

- Very fast **CO,CO2 and NO2** detection
- NDIR based (no Electrochemical cell)
- Sample filter with blow-up system
- ready to add O2 detection
- Wall mounting
- Continuous sensor status monitoring
- Low cost-of-ownership
- Sample conditioning system inside
- Type of installation Plug & Play
- Touch Screen monitor
- Ethernet and USB Remoting
- Modbus, Profibus, Ethernet output
- Download data on SD card
- Digital and analog output

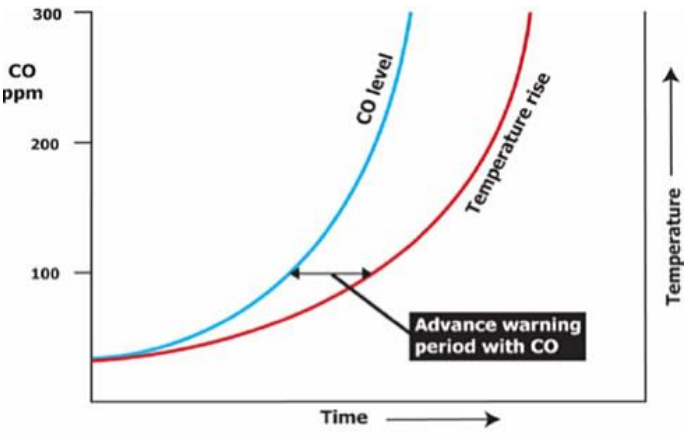
Why need to monitor CO,CO2,Hexane (HC based) and NO2 for Early Fire Detection ?

While most coal-handling facilities today have some type of plant-wide monitoring and control system in place for fire detection, many of these still employ outdated devices and methods for effective suppression of fires and prevention of explosions.

Silo gas formation

•A variety of gases can be formed in conventional silos but generally,carbon monoxide , nitrogen dioxide and carbon dioxide are the most prevalent type of gases. Dangers of Explosive Solvents in Soybean Manufacture must be considered . Vapours produced in using hexane and similar inflammable solvents in extracting oil from soybeans may be easily ignited and cause disastrous explosions. The building of extracting plants is being considered in many rural communities, as this year's soybean crop is almost twice as large as last year's.

•Unlike carbon dioxide, nitrogen dioxide levels reach a peak about three days after harvesting and rapidly begin to decrease thereafter, particularly if the silo is ventilated.
More and more power plants and coal preparation plants today are utilizing carbon monoxide detection to pinpoint hot spots or smoldering fires, and methane detection to prevent explosion.



Fire Advanced Warning - CO vs Temperature

SILO SAFEGUARD 2.0

Characteristics of Dangerous Gases That May Be Present in Silos.

Gas	Health Effects		Exposure Level Maximums*			Physical properties			Flammable Properties
	Acute	Long Term	Immediately Dangerous to Life and Health	Short-Term Exposure**	8-hour Work Day	Density (Air=1)	Color	Odor	
Carbon Monoxide (CO)	Asphyxiant	--	1,500	400	50	.97	Colorless	odorless	Explosive between 12.5 % and 74% by volume of air mixture. auto ignites as 1128°F (609°C)
Carbon Dioxide (CO_2)	Asphyxiant	--	50,000	15,000	5,000	1.52	colorless	odorless	Non-flammable
Nitrogen Dioxide (NO_2)	Respiratory Irritant	Permanent Lung Damage	50	No standard presently in effect	3	1.16	reddish brown	strong pungent	Non-flammable but will support combustion
Nitric Oxide (NO)	Asphyxiant	--	100	35	25	1.53	colorless	strong pungent	Non-flammable but will support combustion

* Numbers represent parts of gas per million parts of air (ppm).** Fifteen-minute exposure, maximum four exposures per eight-hour day with 60-minute intervals between exposures.

Carbon monoxide is formed in small quantities during fermentation. Once a fire starts, however, incomplete combustion of cellulosic materials (such as silage) forms larger quantities.

Carbon Dioxide is present in small quantities in a flaming fire or after complete combustion. Carbon dioxide is non-flammable and heavier than air. At low concentrations, it is non-toxic, but at higher concentrations, it displaces oxygen and acts as an asphyxiant.

Nitric Oxide and Nitrogen Dioxide are poisonous gases which form when nitrogenous organic compounds (such as silage) burn. These gases also occur as by-products of silage fermentation. The highest levels are present during the first 48 hours after the silage is put into the silo, but dangerous levels may persist for up to three weeks. Nitrogen dioxide is the most dangerous and most likely to be present in the silo.

MAIN FEATURES

Response Time	Response times are specified at a sample flow rate of a 1 liter per minute through the MCA 100 sample cell
Warm-up Time	30 seconds ready,3 minutes useable,30 minutes to full performance
Operating Temperature	0° to 70° C (32° to 158° F)
Operating Humidity	To 95% RH (Non-condensing)
Communications (optional)	Ethernet – Profibus – Modbus
Analog Signal Output	4-20 ma for each measured compound