



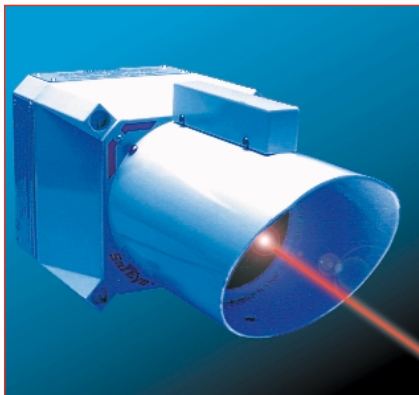
# MSA SafEye Open Path Gas Detection System

[ Long-range detection of combustible gases ]



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**MSA's SafEye Open Path Gas Detection System is a self-contained, optical, gas detection system. Using breakthrough technology, the SafEye Detector can detect combustible gases below the lower explosion limit (LEL) range over an open path up to 450 feet long.**

The MSA SafEye Open Path Gas Detection System is a self-contained optical gas detection system. Using break-through technology, the SafEye Detector can detect combustible gases below the lower explosion (LEL) range over an open path up to 450 feet long.

Open Path gas monitoring technology is typically used in situations requiring long distance gas detection. Such applications include storage vessels or perimeter monitoring around refineries, chemical and petro-chemical plants, or over pipelines. SafEye Gas Detection Systems are available in various configurations. Shorter path units are ideally suited for monitoring ventilation ducts, drying ovens, or any area where it may be advantageous for the gas detection system to monitor a cross-sectional area rather than a specific location.

Open Path gas monitoring is cost-effective, providing complete gas detection of an open area along a line of sight. Standard point-type gas monitors provide coverage at the location of the sensor only while Open-Path provides complete linear coverage across an open area. Advantages include lower installation and maintenance costs, as one SafEye Gas Detection can replace ten or more point-type detectors.

The SafEye Gas Detection System is factory-calibrated to typical hydrocarbons which may leak in a location. This results in the most accurate gas concentration measurement.

The SafEye Gas Detection System can be connected to any 4-20 mA control unit. An alarm condition activates the unit's internal relays. An RS-485 communication link provides a local networking interface, up to 64 systems, that

can be connected to a host computer for central monitoring. All alarm and operating parameters are factory-set but field-changeable.

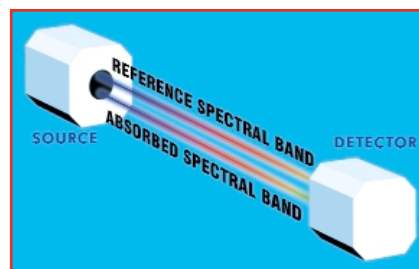
The SafEye Gas Detection System's patented flash source allows the detector to synchronize with the burst of IR energy from the source. This prevents false alarms associated with any stray IR energy from sources as sunlight, welding, etc. This makes the SafEye System unique from all other competitive units and allows for safe, error-free monitoring of the targeted area.

## Applications

- Refineries/Oil platforms
- Petrochemical Industry
- Chemical Industry (polymers, plastics)
- Pharmaceutical Industry
- Servicing Industry (pipelines, refueling stations and fuel storage facilities)
- Transportation (depots, trucks, marine tanks, etc.)
- Drying ovens
- Ventilation ducts

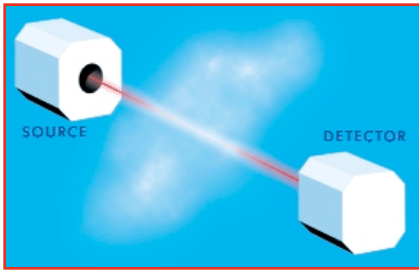
## Operation

All SafEye systems utilize a dual beam concept. The "sample" beam is in the Infrared wavelength which absorbs hydrocarbons, while a second beam or "reference" is outside this gas-absorbing



The "dual-beam" concept

\*SafEye is a trademark of Spectrex, Inc.



**Infrared beam transverses gas cloud**

wavelength. The ratio of the two beams is continuously compared. When no gas is present the signal ratio is constant. When a gas cloud crosses the beam, the sample signal is absorbed or reduced in proportion to the amount of gas present while the reference beam is not. This concept allows SafEye Systems to operate in extreme weather conditions.

If obscuration of the beam occurs as a result of fog, rain, or other adverse conditions, both beams are affected equally. Since the ratio remains the same, the output would still correspond correctly. The SafEye System also has unique capabilities to compensate for water vapor, another common problem typically encountered when monitoring the outdoor environment. SafEye Systems can operate normally with up to 90% of its signal obscured or diminished.

In addition, all SafEye Systems have a built-in temperature sensor located in the gas sensor compartment. The temperature data is used to automatically compensate for temperature changes.

Since the SafEye System employs infrared energy as its method of detection, oxygen is not required for proper operation. This is important when considering the type of events that may take place in a catastrophic situation. Events such as complete rupture of a storage vessel or pipeline may cause a high concentration of gas, depleting air or oxygen required for other types of detectors to operate properly. The SafEye System will report all gas concentrations up to its maximum range and will not

become saturated beyond that point.

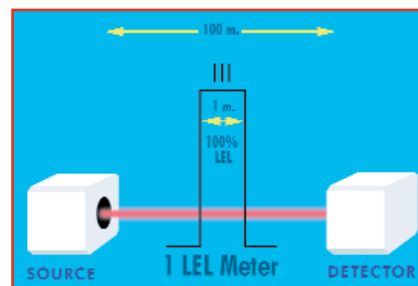
## Features

- Remote gas detection - up to 450 feet
- Simultaneous detection of C1 through C8 combustible gases
- High sensitivity
- Explosion-proof
- Multiple outputs for easy field installation
- No oxygen required for proper operation

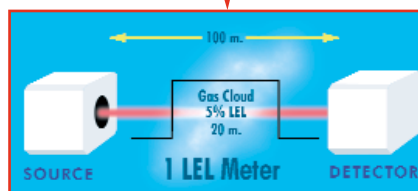
## LEL Meters- A New Concept

Traditional point-type combustible detectors measure the amount of gas entering the chamber of the detector. The readout of these sensors expresses the units of that exact concentration. In an Open-Path System, the corresponding signal is expressed in LEL Meters. One LEL Meter is equivalent to 100% LEL over a 1 Meter path length. Accordingly, 1 LEL Meter can also be expressed as 5% LEL over 20 Meters or 1% LEL over 100 Meters. This can be interpreted as the total gas measurement over the path length. The SafEye System can provide readings up to a maximum range of 5 LEL Meters.

The general concept of this type of detection is to have the capability to provide protection across a much larger area while pinpointing the



**LEL - meter concept diagrams.**



source of the leak or cloud is left to an alternate type of detection.

The Open Path System cannot distinguish between a highly concentrated small cloud of gas and a widely diffused cloud of gas having much less concentration.

## Installation and Start-Up

SafEye Systems can easily be installed without special tools or other equipment. All Detector units have front facing LEDs that provide all the necessary information for alignment, zeroing, and normal operation. Switching into any of these modes can be easily accomplished with use of a magnetically operated, non-intrusive selection port. Simply align the units visually or through the use of telescopes; provide fine adjustment by utilizing the front panel LEDs. Alternately, PC-based software provided with each unit can be used to view exact signal levels, ratios, and other operating parameters.

## Physical Design

The transmitter and detector housings are made of a heavy-duty, copper-free aluminum housing (stainless steel housing optional), casting-coated with epoxy enamel. The viewing windows and back covers are all sealed with special O-rings to prevent intrusion of dust, salt spray, and foam/water fire fighting agents. The internal circuit boards are conformally coated and shock-mounted to minimize damage from mechanical vibration and impact. The housings are explosion-proof and are tested to NEMA 250 type 6 (IP67) ratings and meet MIL-STD-810C.

## Accessories

- Mounting bases
- Duct mount kits
- Calibration cell
- Calibration filter
- Air shield
- Weather shield
- Alignment telescope
- Mode selection magnet.

## Ordering Information

For ordering information, contact your nearest MSA Representative or MSA.

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### Specifications

#### Detected Gases

IR (C1-C8)Hydrocarbons

#### Detection Range

3-450 ft.

#### Spectral Response

IR band 3.0 - 4.0 microns

#### Response Time

Normal conditions - 5 seconds  
Severe conditions - 20 seconds

#### Gas Concentration

Detected over distance range 0-5 LEL meters standard

#### Field of View

Line of sight

#### Indicators

LED status indicators

#### Electrical

Power Supply Source 24VDC nom.; 110mA avg.; 230mA peak  
Detector 150mA @ 24VDC nom.

#### Output

4-20 mA current source provided: Normal, Warning, Alarm, Obscuration and Fault  
Three dry contact relays rating: 2A @ 30VDC or 250VAC.  
RS-485 for computer interface.

#### Environmental Tests

MIL-STD-810C

Humidity - Method 507.1 Proc. IV  
Salt Fog - Method 509.1 Proc. I  
Dust - Method 510.1 Proc. I  
Vibration - Method 514.2 Proc. VIII

#### Temperature Range

Detector -40°C (-40°F) to 55°C (131°F)

#### Explosion-proof Enclosure

UL & CENELEC Approved

Class I Div. 1 Groups C & D  
Class II Div. 2 Groups E, F & G

Water and Dust tight per NEMA 250 type 6P

#### Physical

Weight	Detector	8.8 lb
	Source	10.8 lb
Dimensions	Detector	5.2"W x 5.2"H x 9"L
	Source	5.2"W x 5.2"H x 9"L

**Note:** This Data Sheet contains only a general description of the product shown. While uses and performance capabilities are described, under no circumstances should the product be used except by qualified, trained personnel, and not until the instructions, labels or other literature accompanying the product have been carefully read and understood and the precautions therein set forth followed. Only they contain the complete and detailed information concerning this product.

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