SPECTREX

SafEye XENON 700S

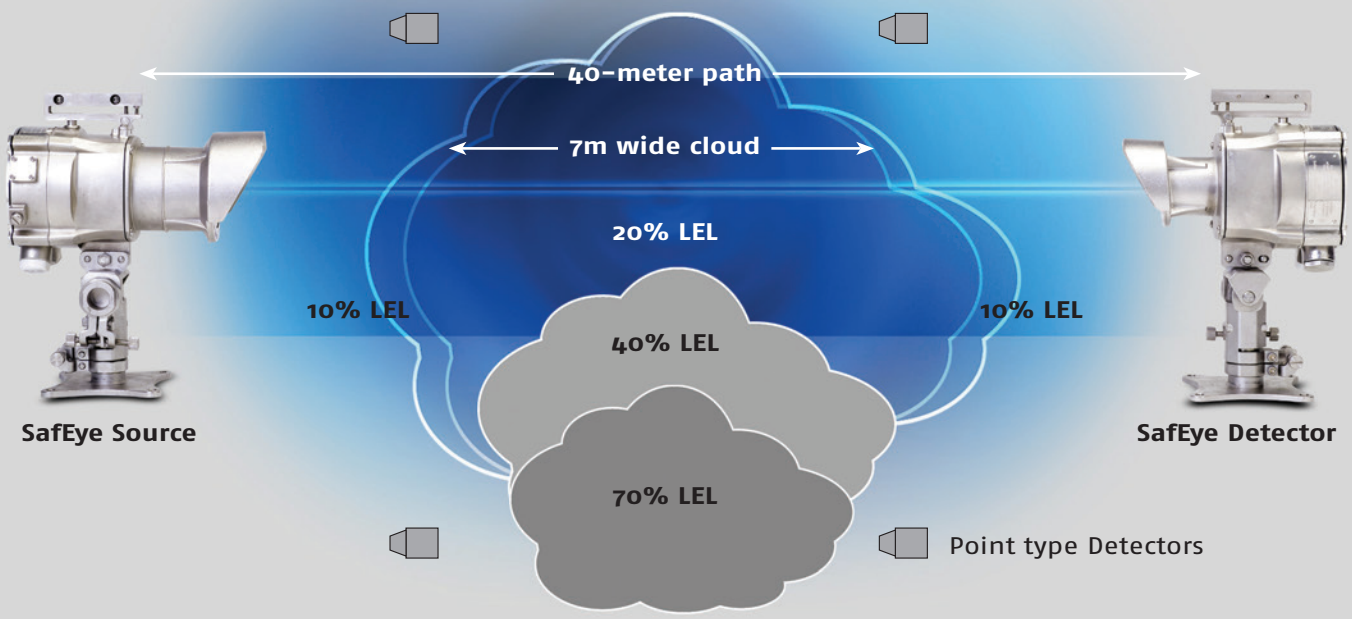
OPEN-PATH GAS DETECTION SYSTEM

SIL2 APPROVED BY TUV

WE INVENTED IT... WE PERFECTED IT!

LEL.METERS

Open-path Gas Detection Concepts



This scenario shows how the matrix of point type detectors can miss a leak or eventually only see diluted gas levels whereas SafEye 700S Open-Path will, in this case, measure 20% LEL x 7 m = 1.4 LEL.m - well above 1 LEL.m alarm level

Not all gas clouds are hazardous - only if a flammable gas cloud or plume is wide enough to allow flame acceleration to speeds greater than 100 m/sec does it become a significant threat.

- Just as an athlete performing the long jump needs a run-up distance, so too a flame front needs distance to reach the velocities which cause the damaging effects of over-pressure, pressure pulse and windage.
- The generally accepted quantity of gas that creates the potential to cause consequential damage if ignited is a cloud of the size 5 m diameter a stoichiometric concentration (about 200% LEL).
- To provide a safety margin, this concentration is halved to 100% LEL. Thus an open path beam traversing this cloud would indicate 5 LEL.m.
- Location of the SafEye 700S Open-Path Gas Detector is less important than with point type detectors as it provides a warning alarm from a diluted gas cloud and does not need to be close to the leakage source.
- Point type detectors measure gas at their location in terms of % LEL, whereas open-path gas detectors measure the amount of gas anywhere along the length of the path, in terms of the integral of concentration and length (LEL x meters).

LEL.meters

Detector output = gas cloud length (m) x gas cloud concentration (LEL)

The unit of measurement is LEL.meters:
100% LEL of the gas = 1 LEL
1 LEL.meter = 1 LEL x 1 meter

Therefore:
20 m x 5% LEL = 1 LEL.meter
1 m x 100% LEL = 1 LEL.meter
10 m x 10% LEL = 1 LEL.meter

Highest Quality backed by

3-year warranty for the 700S-system

10-year warranty for Xenon Flash Bulb

Integrates well-proven and superior Xenon Flash technology which has an excellent operational record in many installations ranging from the deserts of Africa and Asia and the very hot and humid Far East, to the wet and cold North Sea and the dry and cold regions of Alaska.

- **Proven Technology**
  The NEW SafEye Version is based on proven technology and performance. Thousands of first generation Flash Type SafEye are installed on offshore platforms, FPSO's, refineries, and other onshore applications operated by British Petroleum (BP), Shell, ExxonMobil, Statoil, and others.
- **One-Person Commissioning and Installation**
  One person can simply and easily align and commission SafEye with separate horizontal and vertical adjustments.
- **Fast Response**
  Direct reading, high sensitivity and fast response (3 sec) ensures instant action and maximum safety.
- **Harsh Environment**
  Well-proven in harsh environments (rain, snow, fog, hot and humid weather), up to 90% beam blockage, an excellent operational record in many installations worldwide.
  - Heated Optics on the source and detector increase the temperature of the optical surface to reduce icing, condensation and snow.
  - Resilient and excellent performance withstanding extreme vibrations, displacement and shock.
  - Solar blind and immune to false alarms from industrial environments.
- **Reliable**
  Fully approved by TUV to SIL2 (IEC 61508)
- **Detects a Wide Range of Gases**
  Reliable detection of gas leaks including a wide range of gaseous hydrocarbons, such as: Alkanes, Alkenes (C1-C8), Alcohols, LNG, LPG, Ethylene, etc.
- **Cost Effective**
  Less units needed for protection compared with point type detection.
  One system can replace from 5 to 20 point gas detectors. Low cost of ownership, much lower installation cost!
- **Large Misalignment Tolerance**
  Provides relatively wide angle of view, better than 1°, to withstand vibration, mechanical shock and displacements.
- **Standard Interface Options**
  Standard 4-20 mA output with a new mode (3 mA) "Maintenance call" or RS-485, Modbus-compatible output to allow networking (up to 256 detectors) to a central monitoring / PC system. This feature also enables easy maintenance, local and remote diagnostic tools.
- **No Poisoning Effect**
  Electro-optical system, not affected by chemicals.
- **Rugged Construction**
  Stainless steel 316L, IP66/67, Zone 1 ready design.

TYPICAL APPLICATIONS

Oil Rigs
SafEye Open Path Gas Detection System provides alarm and shutdown signals that enable emergency and preventive measures.

Onshore Oil & Gas Industry
Many process and storage areas in the modern refinery are protected by the SafEye systems.

FPSO Vessels
SafEye Open Path Systems protect duct, air intakes and HVAC providing warning and alarm in case of migration of dangerous gas concentrations.

Process Plants & Pipelines
LNG/LPG and Polymers are being monitored by the SafEye system that detects at LEL levels.

Open-Path Applications:

- Offshore Oil & Gas drilling and production
- Petrochemical and Chemical storage and production areas
- Storage & loading of hazardous materials and waste areas
- Engine & Turbine air intake and modules
- LNG-LPG storage, pumping and filling
- Fence-line emission monitoring
- Storage Tank Farm protection
- Paint industries, including paint-booths
- Bus terminals (natural gas powered)
- Waste disposal and processing

PRODUCT DESCRIPTION

The SafEye 700S Optical Open Path (Line-of-Sight) Gas Detection System employs "spectral fingerprint" analysis of the atmosphere using the Differential Optical Absorption Spectroscopy (DOAS) technique in a unique (patented) method.

SafEye 700S consists of an advanced Xenon Flash infrared transmitter (source) and infrared detector (receiver), separated over a line of sight from 13 ft. (4 m) up to 460 ft. (140 m) to detect and quantify flammable gas presence, even when challenged by extremely harsh environments where dust, fog, rain, snow or vibration can cause a high reduction of signal.

The SafEye 700S analyzes atmospheric absorption at three selected spectral bands, two in a region where the target gas absorbs and one where it does not absorb. The ratio between these absorption lines can provide accurate information of the gas concentration along an optical path.

The reference sensor detects beam blockage, compensates for changing humidity and detects failed light source or dirty optics.

SafEye's source and detector units are both housed in low profile, rugged and stainless steel enclosures.

SafEye 700S includes heated optics on the transmitter (source) and receiver (detector) to address icing, condensation and snow.

Modern accessories include an Intrinsically Safe approved, Hand-Held Unit which is an all-in-one Diagnostic / Calibration / Interrogation plug-in unit that assists one-person installation and maintenance.

PRODUCT SPECIFICATIONS

General Specifications

Detection Range

	Model	701S	702S	703S	721S	722S	723S
	ft	13-66	50-230	165-460	13-66	50-230	165-460
	m	4-20	15-70	50-140	4-20	15-70	50-140
	Detected gas	C_1-C_8			Ethylene		

Response Time	T90 - 3 sec.
Immunity to False Alarm	Not influenced by solar radiation, hydrocarbon flames and other external IR radiation sources
Spectral Response	2.0 - 4.0 µm.
Sensitivity Range	0 - 5 LEL.m (optional 0 - 2 LEL.m)
Displacement/Misalignment Tolerance	±1˚
Accuracy	±5% of full scale or ±10% of the reading, whichever is greater
Repeatability	±5% of the reading
Temperature Range	-40˚F (-40˚C) to 131˚F (55˚C)
Warranty	SafEye system - 3 years Flash source bulb - 10 years

Outputs – Interfaces

4-20 mA Current Output — Sink (source option) configuration

Maximum load	600Ω at 18-32 VAC
4-20mA	Gas reading
4mA	Normal, zero reading
3mA	Maintenance call
2mA	Obscuration/misalignment /beam block
1mA	Zero calibration mode
0mA	Fault

HART Protocol	HART communications on the 0-20mA analog current (FSK) - used for maintenance, configuration changes and asset management, available in mA source output wiring options
RS-485 Interface - Modbus Compatible	The RS-485 input/output provides complete data information to a PC and receives control commands from the PC or handheld unit
Relays	Alarm, Fault and Accessory SPST volt-free contacts rated 5A at 30 VDC or 250 VAC Fault relay normally closed, others normally open

Electrical Specifications

Power Supply		24 VDC nominal (18-32 VDC)
Power Consumption (peak includes heated optics)		Detector: 150mA (300 mA Peak) Source: 100mA (300 mA Peak)
Electrical Connection (specify)		2 x 3/4" - 14NPT conduits or 2 x M25 x 1.5 mm ISO
Electric Input Protection		According to MIL-STD-1275B
Electromagnetic Compatibility		EMI/RFI protected against EN 50270 & CE Marked

Mechanical Specifications

Enclosure		The source and detector housings are stainless steel 316L with electropolish finish. The circuit boards are conformal coated and protected from mechanical vibrations. The tilt mount is also Stainless Steel 316L
Dimensions	Detector Source Tilt Mount	8.2 x 5.7 x 6 inch (210 x 145 x 154 mm) 10 x 5.3 x 6.9 inch (255 x 135 x 175 mm) 4.7 x 4.7 x 5.5 inch (120 x 120 x 140 mm)
Weight	Detector Source Tilt Mount	9.2 Lb (4.2 Kg.) 10.1 Lb (4.6 Kg) 4.2 Lb (1.9 Kg)
Water and Dust Tight		IP66 and IP67 NEMA 250 6P
Environmental		Meets MIL-STD-810C for Humidity, Salt & Fog, Vibration, Mechanical Shock, High Temp, Low Temp

Approvals

Hazardous Area Approval	IECEx	Ex d e ia [ia Ga] IIC T5 Gb Ta = -40°C to +55°C
Reliability		IEC61508 - SIL2 (TUV)
Other		TR CU/EAC

Accessories

Tilt Mount	P/N 799640
Pole Mount (U-Bolt 2-3 inch)	P/N 888140
Pole Mount (U-Bolt 4-5 inch)	P/N799225
Wall Mount	P/N 799255
HART Hand-held Diagnostic Unit	P/N 888810
USB/RS485 Harness Converter Kit	P/N 794079
Commission Kit	P/N 799247
Weather Cover for the Source Unit	P/N 799267
Weather Cover for the Detector Unit	P/N 799250
Mini Laptop Kit	P/N 777820

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DS-G-700S, April 2017