Certificate

Product Safety
Functional
Safety

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No.: 968/EZ 619.04/18

Product tested	IR Open-Path Gas Detector	**Certificate holder**	Rosemount Inc. 8200 Market Boulevard Chanhassen, MN 55317 USA
Type designation	Spectrex SafEye ‘Quasar 900’		
Codes and standards	IEC 61508 Parts 1-7:2010 EN 50271:2010 EN 50402:2005+ A1:2008 + AC:2009 (in extracts)		EN 60079-29-4:2010 EN 50270:2015
Intended application	The Spectrex SafEye ‘Quasar 900’ complies with the requirements of the relevant functional and safety standards (EN 50271, EN 60079-29-4, SIL 2 acc. to IEC 61508 and EN 50402) and can be used in combination with an external safety device for monitoring of hazardous flammable gas / vapor concentrations.		
Specific requirements	The instructions of the associated "User's and Maintenance Manual" shall be considered. Details for the use in safety functions can be found on the backside of this certificate.		

Valid until 2020-02-04

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/EZ 619.04/18 dated 2018-10-18.
This certificate is valid only for products which are identical with the product tested.

Köln, 2018-10-18

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln
Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Gebhard Bouwer

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TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln / Germany
Tel.: +49 221 806-1790, Fax: +49 221 806-1539, E-Mail: industrie-service@de.tuv.com

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Safety function:

The safety function of the SafEye 'Quasar 900' IR Open-Path Gas Detector is defined by measuring of the level of hazardous flammable gases / vapors and announces this over the 4 - 20 mA - interface.

The evaluation of this level regarding a dangerous concentration must be performed by an external safety device.

After detection of internal or external faults the safe state is entered, that means that the 4 - 20 mA - interface is set < 4 mA. This must be evaluated by the external safety device and handled as fault condition.

Characteristics as per IEC 61508:

SIL	2
HFT	0
Device Type	B
Mode of operation	Low demand and high demand or continues mode
SFF	97 %
Proof-Test-Interval T_1	1 year
λ_{DU}	114,8 fit
λ_{DD}	1861,4 fit
λ_D	1976,1 fit
λ_S	2056,1 fit
PFDavg	$6,5 \times 10^{-4}$
PFD (%) of SIL2	6,4 %
PFH	$1,2 \times 10^{-7}$ 1/h
PFH (%) of SIL2	12 %

Remarks:

- Failure rates of the electronic components as per Siemens SN 29500, calculated based upon an ambient temperature of 65 °C and statistical data of the sensor elements
- The calculation was performed based on a Proof-Test-Interval T_1 = 365 days
- Without knowledge of the partly redundant internal structure of the detector a calculation with other Proof-Test-Interval (e.g. 2 years) leads only to an approximate result