# Certificate

Product Safety
Functional
Safety

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## No.: 968/FSP 1269.01/17

| | | | |
|---|---|---|---|
| **Product tested** | Toxic & Aromatic Open-Path Gas Detection System | **Certificate holder** | Rosemount Inc.<br>8200 Market Boulevard<br>Chanhassen, MN 55317<br>USA |
| **Type designation** | Spectrex SafEye Quasar 950/960 | | |
| **Codes and standards** | IEC 61508 Parts 1-7:2010<br>EN 60079-29-4:2010<br>EN 50402:2005+ A1:2008 + AC:2009<br>(in extracts) | | EN 50271:2010<br>EN 50270:2015 |
| **Intended application** | The Spectrex SafEye Quasar 950/960, Toxic & Aromatic Open-Path Gas Detection System complies with the requirements of the mentioned standards, esp. SIL 2 acc. to IEC 61508 and can be used in combination with an external safety device for the detection and monitoring of toxic gases, such as ammonia, H2S and aromatics. | | |
| **Specific requirements** | The instructions of the associated User's and Maintenance Manual shall be considered. Details see backside of this certificate. | | |

Valid until 2021-04-14

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 1269.01/17 dated 2017-05-04.
This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
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Köln, 2017-05-04

Certification Body Safety & Security for Automation & Grid

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Safety function: The safety function of the Quasar 950/960 is defined by measuring of the level of toxic gases, such as ammonia, H2S and aromatics and announces this over the 4 - 20 mA – interface. Output current <4 mA and >20 mA have to be treated as failure conditions by the downstream safety device.

| **Characteristics as per IEC 61508** | **Value** |
|---|---|
| SIL | SIL 2 (single-channel architecture, 1oo1, HFT = 0) |
| HFT | 0 |
| Device Type | B |
| Mode of operation | Low demand mode and high demand mode or continuous mode |
| SFF | 97 % |
| DC | 94 % |
| Time interval for proof-testing T1 | 1 year |
| $PFD_{avg}$ for T1 = 1 year | $5.5 \times 10^{-4}$ (5.5 % of SIL 2) |
| PFH | $9.7 \times 10^{-8}$ 1/h (9.7 % of SIL 2) |
| $\lambda_s$ | 1762 FIT |
| $\lambda_{sd}$ | 1661 FIT |
| $\lambda_{su}$ | 101 FIT |
| $\lambda_d$ | 1722 FIT |
| $\lambda_{dd}$ | 1625 FIT |
| $\lambda_{du}$ | 97 FIT |
| $\lambda_{tot}$ | 3484 FIT |

1 FIT = $1 \times 10^{-9}$ 1/h

Remark: Failure rates of the electronic components as per Siemens SN 29500, calculated based upon an ambient temperature max. 65 °C.