| | |
|---|---|
| Document number: | H076_CT001 rev. 6 |
| Dated: | 30-Sep-26 |
| Expiry date: | 30-Sep-29 |

# IEC 61508 Functional Safety Capability Statement

## Tyco Fire & Security GmbH (TFSG), FV421i Intrinsically Safe (IS) Flame Detector

| | |
|---|---|
| Manufacturer: | Tyco Fire & Security GmbH (TFSG)<br>Victor Von Bruns-Strasse 21, 8212 Neuhausen am Rheinfall, Schaffhausen, Switzerland |
| Product: | Flame Detector |
| Model: | FV421i |

| | |
|---|---|
| Application: | Low Demand Mode Safety Instrumented Function |
| Safety Function: | Upon detection of fire, action is initiated (Logic solver and final element subsystems not part of this analysis) |
| Applied standard: | IEC 61508 Ed2 2010 Parts 1-3 & IEC 61511 Ed1 |
| Systematic Capability: | Suitable up to SIL 2 |
| Applicable report: | Environmental Resources Management Ltd Report: SIL Random Hardware Capability Assessment Report: H076_FM001 rev. 6<br>Failure Modes, Effects and Diagnostics Analysis (FMEDA) Spreadsheet: H076_FV421i_FMEDA rev.1.xlsx<br>Environmental Resources Management Ltd Report: (IEC 61508 Part 1) Assessment Report: H076_SM001 rev. 6<br>Environmental Resources Management Ltd Report: (IEC 61508 Part 2) Assessment Report: H076_SM002 rev. 6<br>Environmental Resources Management Ltd Report: (IEC 61508 Part 3) Assessment Report: H076_SM003 rev. 6 |

| | |
|---|---|
| Assessment Route: | $1_H$ |
| Hardware Fault Tolerance: | 0 |
| Type: | B |
| Application restrictions: | None |

| Model No. | λDU (/hr) | λDD (/hr) | λS (/hr) | SFF | SIL AC (HFT = 0) | SIL SC |
|---|---|---|---|---|---|---|
| FV421i – Conventional Interface | 1.2E-07 | 7.0E-07 | 5.8E-07 | 91% | SIL 2 | SC 2 |
| FV421i – MX Interface | 1.3E-07 | 9.3E-07 | 6.3E-07 | 93% | SIL 2 | SC 2 |
| FV421i – 4-20mA Interface | 9.0E-08 | 7.9E-07 | 5.2E-07 | 94% | SIL 2 | SC 2 |
| FV421i – HART Interface | 9.2E-08 | 8.2E-07 | 5.2E-07 | 94% | SIL 2 | SC 2 |

© Copyright 2026 by The ERM International Group Limited and/or its affiliates ('ERM'). All Rights Reserved.

| | |
|---|---|
| Document number: | H076_CT001 rev. 6 |
| Dated: | 30-Sep-26 |
| Expiry date: | 30-Sep-29 |

| Model No. | λDU (/hr) | λDD (/hr) | λS (/hr) | SFF | SIL AC (HFT = 0) | SIL SC |
|---|---|---|---|---|---|---|
| FV421i – Modbus Interface | 9.3E-08 | 7.9E-07 | 5.4E-07 | 94% | SIL 2 | SC 2 |

**SIL AC (Architectural Constraints):** Represents the maximum allowable SIL of each hardware element, assuming Hardware Fault Tolerance (HFT) = 0.

**SIL SC (Systematic Capability):** A measure of confidence (expressed on a scale of SC 1 to SC 4) of the confidence that the systematic safety integrity of a device meets the requirements of the specified SIL.

It should be noted that for a device to claim compliance with a specified SIL, the SIL AC and SC of the device needs to both be met. In addition to this, the required Average Probability of Failure on Demand (PFDavg) value for the complete Safety Instrumented Function (SIF) needs to adhere to the SIL PFDavg ranges.

**IMPORTANT**: It should be noted that this assessment considers only the Tyco Fire & Security GmbH (TFSG), FV421i Intrinsically Safe (IS) Flame Detector. It does not cover opening and closing time requirements and a random hardware failures assessment must be conducted for the entire safety function for each application as per the appropriate Safety Requirements Specification.

The Tyco Fire & Security GmbH (TFSG), FV421i Intrinsically Safe (IS) Flame Detector has been assessed and is considered capable for use in a low demand mode safety function up to (and including) SIL 2 with regards to random hardware failures, architectural constraints and systematic capability.

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required Probability of Failure on Demand (PFD) / Probability of Failure per Hour (PFH), considering any redundancy, Proof Test Interval (PTI), Proof Test Coverage (PTC), Mission Time and Mean Time To Restoration (MTTR) for all elements included in the SIF. Each subsystem should be verified to ensure compliance with the minimum HFT requirements.

| | |
|---|---|
| Chantal Sealey FS Eng (TÜV Rheinland)<br>Assessor<br>chantal.sealey@erm.com | Simon Burwood FS Expert (TÜV Rheinland)<br>Assessment Authority<br>simon.burwood@erm.com |