



# ENGINEERING SAFETY CONSULTANTS

*The Global Provider of Functional Safety Expertise and Technical Consultancy*

## IEC 61508 Safety Integrity Level Capability Certificate

### **Functional Safety of Safety-Related Programmable Electronic Systems**

**Manufacturer:** Tyco Fire & Security GmbH (TFSG)  
Victor Von Bruns-Strasse 21  
8212 Neuhausen am Rheinfall  
Schaffhausen  
Switzerland

The **TFSG, 801PHEX I.S. Optical Smoke + Heat Detector** (function of this module is to provide detection modes of smoke and heat in an intrinsically safe environment) has been assessed and is considered capable for use in a low demand Safety Function up to (and including) SIL 2 with regards to systematic capability (assessed under the Prior Use route), random hardware failures and architectural constraints.

The assessment was based on the assumptions, data provided, and recommendations given in:

- **Engineering Safety Consultants Ltd Report: D152\_SV007 rev.5, which includes details associated with the Safety Manual requirements in Appendix B;**
- **Engineering Safety Consultants Ltd Report: D152\_PU001 rev.4;**
- **Renewal Letter from Tyco Fire & Security GmbH, signed by Deepika Sahni, Principal Regulatory Engineer, Dated 27<sup>th</sup> April 2023.**

The assessment was carried out against failure modes where the detector was unable to detect an alarm condition and process alarms over the addressable system.

The assessment was carried out to determine compliance with IEC 61508 (2010 Edition) with regards to:

- SIL 2 with a HFT = 0 via Route 1<sub>H</sub>;
- Architectural Constraint (Type B, SFF >90%, <99%);
- Systematic Capability against IEC 61508 (2010 Edition) via Route 2<sub>S</sub>.

| Device                                     | $\lambda_{DU}$ (/hr) | $\lambda_{DD}$ (/hr) | $\lambda_S$ (/hr) | SFF (%) | Device Type | Estimated SIL Capability |
|--|----------------------|----------------------|-------------------|---------|-------------|--------------------------|
| 801PHEX I.S. Optical Smoke + Heat Detector | 1.4E-08              | 3.8E-07              | 1.6E-08           | 97      | B           | SIL 2                    |

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required PFD / PFH, considering any redundancy, Proof Test Interval (PTI), Proof Test 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.

**IMPORTANT:** It should be noted that this assessment does not include confirmation of the response time of the device. For response times (along with any relevant assumptions) reference should be made to the Safety Manual of each device and the total SIF response time **MUST** be compared against the process safety time for the specific application.

Managing Director: Simon Burwood  
Assessment Date: April 2015  
Renewal Date: April 2023, valid to April 2025  
Certificate: D152\_CT007 rev. 8

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