



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 2

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, Generation 6 PH detectors** have been assessed and are considered capable for use in a low demand Safety Function up to SIL 2, with regards to random failure rates and architectural constraints.

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

- **Generation 6 PH Review Report Iss3, by TFSG dated 02/07/2012;**
- **Generation 6 PH FMEDA Iss2, by TFSG dated 06/06/2012;**
- **Renewal Letter from Tyco Fire & Security GmbH, signed by Deepika Sahni, Regulatory Engineer, Dated 29th April 2019.**

The assessment was carried out against failure modes where the detectors were unable to detect and process alarms over the addressable system. The following models were assessed:

- **Generation 6 850PH;**
- **Generation 6 851PH;**
- **Generation 6 851PHN;**
- **Generation 6 856PH;**
- **Generation 6 840PH;**
- **Generation 6 830PH;**
- **Generation 6 FC460PH;**
- **Generation 6 4098-6251 Optical Heat;**
- **Generation 6 4098-6231 Optical Heat.**

The assessment was carried out to determine compliance with IEC 61508 with regards to:

- Random Hardware Failures (Predicted PFD <2.0E-03), based on a year's proof test;
- Architectural Constraint (Type B, SFF >90%, <99%).

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ENGINEERING SAFETY CONSULTANTS LTD
Tuition House
27-37 St George's Road Wimbledon London SW19 4EU UK
Telephone/Fax: +44 (0)20 8542 2807
E-Mail: info@esc.uk.net Web: www.esc.uk.net
Registered in England and Wales: 7006868
Registered Office: 27-37 St George's Road Wimbledon London SW19 4EU



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The following models are covered by this certificate:

Model Name	Product Description	λ DU Dangerous Undetected Failures	λ DD Dangerous Detected Failures	λ S Safe Failures	Safe Failure Fraction	PFD _{avg}
850PH	Multi-sensor Detector with s/c Isolator	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
851PH	Multi-sensor Detector with s/c Isolator	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
851PHN	Multi-sensor Detector with s/c Isolator	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
856PH	Multi-sensor Detector with s/c Isolator	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
840PH	Multi-sensor Detector	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
830PH	Multi-sensor Detector	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
FC460PH	Multi-sensor Detector	3.0E-07 /hr	4.1E-06 /hr	4.5E-07 /hr	93%	1.5E-03
4098-6251 Optical Heat	Multi-sensor Detector with s/c Isolator	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03
4098-6231 Optical Heat	Multi-sensor Detector	3.2E-07 /hr	4.3E-06 /hr	4.5E-07 /hr	93%	1.6E-03

It should be noted that all variant models stated above are functionally equivalent to the 850PH, 830PH or FC460PH detectors.

Managing Director: Kenneth G L Simpson
Member of the IEC 61508 committee
Assessment Date: February 2012
Renewal Date: April 2019, valid to April 2021
Certificate: B118_CT004 rev. 5

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