



**Certificate of Conformity to IEC 61508 /
 IEC 61511 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

Fire & Gas Detection Systems

This certificate summarises the hardware failure data affecting the application of the Fire & Gas Detection Systems equipment as part of a Safety Instrumented Function, in order to comply with the requirement of IEC 61508. The Fire & Gas Detection Systems fulfil the requirements to achieve SIL 2 conformity.

HFT is the Hardware Fault Tolerance. All devices are Type B, with the exception of the IOB800 Expansion Board which is a Type A device.

Devices	SFF (%)	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	HFT	PFD with a $T_p = 12$ months
Detectors						
Failure Mode: Unable to detect an alarm condition and process alarms over the addressable system.						
CP840Ex – Weatherproof Break Glass Callpoint	94	1.9E-08	2.1E-07	1.0E-07	0	1.2E-04
DDM800 – Universal Fire & Gas Detector Module	96	5.3E-08	1.2E-06	3.1E-08	0	4.2E-04
EXI800 – IS Loop Interface Module	97	9.1E-09	3.1E-07	0.0E+00	0	9.2E-05
SNM800 – Sounder Notification Module	60	3.1E-07	3.3E-07	1.4E-07	1*	1.4E-03
801CHEx – IS Carbon Monoxide & Heat Detector	97	9.1E-09	3.0E-07	1.7E-08	0	9.0E-05
801HEx – IS Heat Detector	98	6.2E-09	2.5E-07	1.3E-08	0	6.9E-05
801PHEx – IS Optical Smoke & Heat Detector	97	1.4E-08	3.8E-07	1.6E-08	0	1.2E-04
MX / ZX Fire Panel						
Failure Mode: Failure to respond (executive action).						
CPU801	94	1.1E-07	2.6E-06	1.2E-10	0	9.3E-04
TLI800EN Network Module	97	8.3E-09	9.5E-07	0.0E+00	0	2.0E-04
IOB800 Expansion Board (local audible output)	67	7.9E-08	9.9E-08	6.6E-08	0	3.6E-04

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Devices	SFF (%)	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	HFT	PFD with a $T_p = 12$ months
Overall MX/ZX Fire Panel (without local audible output)	95	2.6E-07	3.0E-06	-	0	1.2E-03

***IMPORTANT:** In order to the SNM800 module to achieve SIL 2 in terms of architectural requirements, at any one location a person in a given area should be able to hear at least two of the sounders (duplex configuration) to give a level of redundancy in the event of a fault in one sounder output.

The assessments were based on the assumptions, data provided, and recommendations given in:

- CP840Ex: Engineering Safety Consultants Ltd Report: D152_SV001 rev.3;
- DDM800: Engineering Safety Consultants Ltd Report: D152_SV002 rev.3;
- EXI800: Engineering Safety Consultants Ltd Report: D152_SV003 rev.3;
- SNM800: Engineering Safety Consultants Ltd Report: D152_SV004 rev.3;
- 801CHEx: Engineering Safety Consultants Ltd Report: D152_SV005 rev.3;
- 801Hex: Engineering Safety Consultants Ltd Report: D152_SV006 rev.3;
- 801PHEx: Engineering Safety Consultants Ltd Report: D152_SV007 rev.4;
- CPU801: Engineering Safety Consultants Ltd Report: D152_SV008 rev.4;
- TLI800EN: Engineering Safety Consultants Ltd Report: D152_SV009 rev.4;
- IOB800: Engineering Safety Consultants Ltd Report: D152_SV010 rev.3;
- Technis report No. T432, Issue 4.0;
- Renewal Letter from Tyco Fire & Security GmbH, signed by Deepika Sahni, Principal Regulatory Engineer, Dated 8th April 2021.

IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the devices. 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.

Notes:

- The TLI800EN Network Module & IOB800 Expansion Board can be used in conjunction with the T2000, MX & ZX Fire Panel;
- The assessment undertaken for the CPU801 is valid also for the CPU800 as part of the T2000, MX & ZX Fire Panel;
- A complete analysis of the total Safety Instrumented Function will need to be undertaken to ensure the suitability of the complete SIF meeting the hardware reliability and architectural requirements of the target SIL;
- A one-year proof test interval and repair time of 168 hours was assumed for the above assessments;
- Source data for these analyses is taken from Handbook of Reliability Data-5 & FARADIP.



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Member of IEC 61508 (MT61808-1-2) & IEC 61511 (MT61511) Maintenance Committees
Assessment Date: April 2015
Renewal Date: April 2021, valid to April 2023
Certificate: D152_CT011 rev. 5

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