ENGINEERING SAFETY CONSULTANTS
The Global Provider of Functional Safety Expertise and Technical Consultancy

Random Hardware Reliability Certificate

Functional Safety of Safety-Related Programmable Electronic Systems

The **Hochiki Europe (UK) Ltd, CHQ and YBO Wall and Base Sounders and Beacons** for use in fire detection and alarm systems has been assessed and is considered capable for use in a low demand Safety Function up to (and including) SIL 2, with respect to random hardware failures and architectural constraints.

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

- **Engineering Safety Consultants Ltd Report: D004_SV001 rev. 5;**
- **Renewal letter from Hochiki Europe (UK) Ltd, signed by Shane Bartlett, Compliance Manager Engineer, dated: 03/10/2022.**

The systems were assessed against the following failure modes:

- **CHQ and YBO Sounders: Failure to alarm (sound) on demand;**
- **CHQ and YBO Sounder & Beacon: Failure to alarm (flash and sound) on demand.**

Subject to the following requirements detailed in report D004_SV001 rev. 5:

- **Host system will be configured to detect and alarm on loss of communications to the detector (loss of response to polls);**
- **Manual function tests are carried out frequently (i.e. weekly) and suitably documented, reviewed and audited.**

The following product variants are also covered under this certificate, with the product labels being the only difference:

- CHQ-WS2;
- CHQ-WSB2;
- YBO-BS;
- YBO-BSB2;
- YBO-BSB2/WL;
- YBO-BSB2/RL;
- YBO-BSB2 (WHT)/RL;
- YBO-BSB2 (WHT)/WL;
- CHQ-WS2(WHT);
- CHQ-WS2/SIL;
- CHQ-WSB2/RL;
- CHQ-WSB2/WL;
- YBO-BS(WHT);
- YBO-BS(WHT)/SIL;
- YBO-BSB2(WHT)/RL/SIL;
- YBO-BSB2(WHT)/WL/SIL.

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

- CHQ-WS2: SIL 2 with a HFT = 0 via Route 1_H;
- CHQ-WSB2 WL: SIL 2 with a HFT = 0 via Route 1_H;
- YBO-BS: SIL 2 with a HFT = 0 via Route 1_H;
- YBO-BSB2: SIL 2 with a HFT = 0 via Route 1_H;
- Architectural Constraint (Type B, SFF 90%, ≤99%).

Model no.	λ (/hr)	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_{DD} manual test (/hr)	λ_S (/hr)	SFF	Device Type	Estimated SIL Capability
CHQ-WS2	2.6E-07	2.0E-08	2.0E-08	1.8E-07	6.0E-09	92%	B	SIL 2
CHQ- WSB2	3.8E-07	3.2E-08	3.2E-08	2.9E-07	6.4E-09	92%	B	SIL 2
YBO-BS	2.6E-07	2.0E-08	2.0E-08	1.8E-07	6.0E-09	92%	B	SIL 2
YBO-BSB2	1.1E-06	1.1E-07	1.1E-07	9.5E-07	6.0E-09	91%	B	SIL 2

Note: The PFD or PFH of a complete SIF (inclusive of sensor, logic solver and final element subsystems) must be determined, considering any redundancy, Proof Test Interval (PTI), Proof Test Coverage (PTC), Mission Time and Mean Time To Restoration (MTTR) for all elements. 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: March 2014
Renewal Date: October 2022, valid to October 2024
Certificate: D004_CT001 rev. 8

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