



## ENGINEERING SAFETY CONSULTANTS

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

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# Random Hardware Reliability Certificate

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

The **Hochiki Europe (UK) Ltd, DCD-1E-IS Heat Detector** for use in fire detection and alarm systems which can be used with the mounting base YBN-R/4 (IS), has been assessed and is considered capable for use in a low demand Safety Function up to (and including) SIL 1 or SIL 2, with respect to random hardware failures and architectural constraints.

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

- DCD-1E-IS(WHT);
- DCD-1E-IS/SIL.

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

- **Engineering Safety Consultants Ltd Report: D004\_SV003 rev. 5;**
- **Renewal letter from Hochiki Europe (UK) Ltd, signed by Shane Bartlett, Compliance Manager Engineer, dated: 03/10/2022.**

The system was assessed against the following failure mode:

- **Failure to detect heat and annunciate alarm condition.**

Subject to the following requirements for complying with **SIL 2**:

- **Manual test considered a diagnostic function;**
- **Manual function tests are carried out frequently (i.e. weekly) and suitably documented, reviewed and audited.**

The assessment was carried out to determine compliance with IEC 61508 with regards to **SIL 1**:

- DCD-1E-IS Heat Detector: SIL 1 with a HFT = 0 (excluding manual test) via Route 1H;
- Architectural Constraint (Type A, SFF <60%).

The assessment was carried out to determine compliance with IEC 61508 with regards to **SIL 2**:

- DCD-1E-IS Heat Detector: SIL 2 with a HFT = 0 (including manual test) via Route 1H;
- Architectural Constraint (Type A, SFF 60% - 90%).

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Device	$\lambda$ (/hr)	$\lambda_{DU}$ (/hr)	$\lambda_{DD}$ (/hr)	$\lambda_S$ (/hr)	SFF	Device Type	Estimated SIL Capability
DCD-1E-IS Heat Detector	1.3E-07	8.5E-08	0.0E+00	4.9E-08	36%	A	SIL 1

Device	$\lambda$ (/hr)	$\lambda_{DU}$ (/hr)	$\lambda_{DD}$ manual test(/hr)	$\lambda_S$ (/hr)	SFF	Device Type	Estimated SIL Capability
DCD-1E-IS Heat Detector	1.3E-07	3.4E-08	5.1E-08	4.9E-08	75%	A	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: August 2014  
 Renewal Date: October 2022, valid to October 2024  
 Certificate: D004\_CT003 rev. 8