



## ENGINEERING SAFETY CONSULTANTS

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

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# Random Hardware Reliability and Systematic Assessment Certificate

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

The **Apollo Fire Detectors Ltd, Fire Detectors** have been assessed and are considered capable for use in a low demand Safety Function up to (and including) SIL 2, with respect to random hardware failures, architectural constraints and systematic capability.

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

- **Engineering Safety Consultants Ltd Report: E046\_PU002 rev. 5;**
- **Renewal Letter from Apollo Fire Detection Ltd for products with no changes, signed by Billy Blakeman, Head of Conformance, Dated 23rd August 2022.**

The certified devices can only achieve SIL 2 if used in conjunction with a fire alarm control panel that supports all elements of the Apollo protocol, including full fault diagnostics.

The Safety Manual for each product covered by this certificate should provide a reference to the ESC assessment report: E046\_PU002 rev. 5.

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

- Probability of Failure on Demand (PFD) with a proof test interval ( $T_p$ ) of one year, a proof test coverage (PTC) of 95% or 100%, an Overhaul Interval of 10 years and a repair time of a detected failure of 24 hours against IEC 61508 (2010 Edition) and IEC 61511 (2016 Edition);
- Architectural Constraints (SFF) for Type B equipment against IEC 61508 (2010 Edition);
- Systematic Capability against IEC 61511 (2016 Edition), prior use, suitable up to SIL 2.

| Products Assessed                     | PFD<br>( $T_p = 1$ year, PTC = 100%) | PFD<br>( $T_p = 1$ year, PTC = 95%) | SFF          |
|---------------------------------------|--------------------------------------|-------------------------------------|--------------|
| 55000-721mar Marine Negative Isolator | 1.2E-05                              | 1.7E-05                             | 90% to < 99% |
| 45681-286mar Marine Isolating Base    | 2.6E-05                              | 3.8E-05                             | 90% to < 99% |

**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: May 2016  
Renewal Date: September 2022, valid to September 2024  
Certificate: E046\_CT009 rev. 9

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