ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Random Hardware Reliability Assessment Certificate

Functional Safety of Safety-Related Programmable Electronic Systems

The **NSF Controls Ltd, Motorised Gas Valve** has been assessed and is considered capable for use in a low demand Safety Function up to (and including) SIL 2 capability with regards 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: J010_FM001 rev. 1.**

The product was assessed against the following failure mode:

- **Ability for valve to close on demand and provide seal.**

It should be noted that this assessment was only analysed against its ability of the valve to close and provide a seal on demand. Therefore, the use of this valve within a gas meter (as per the intended application defined by the client) requires further analysis including an assessment of ALL unsafe failure modes associated with the gas meter operations to ensure random hardware failure requirements are still met for the target SIL capability.

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

- Random Hardware Failures (PFD <1.2E-03, with a Mean Down Time (MDT) of 168 hours, Proof Test Interval (PTI) of one year (8760 hours) and Partial Stroke Test (PST) every month (730 hours) with a 70% coverage;
- Random Hardware Failure with Achieved PFH = 6.9E-07
- Random Hardware Failure with Achieved λ_{DD} = 0.0E+00 (/hr);
- Random Hardware Failure with Achieved λ_{DU} = 6.9E-07 (/hr);
- Architectural Constraint (Type A, SFF >60%, <90%), HFT = 0.

It should be noted that the PST is initiated and monitored by an external circuit, however, this external circuit is not included in this assessment, only the effect that it has on the motorised gas valve.

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.

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Member of IEC 61508 (MT61808-1-2) & IEC 61511 (MT61511) Maintenance Committees
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