



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 1

Functional Safety of Safety-Related Programmable Electronic Systems

The **Metrohm Ltd, NDIR XDS Process Analyser ATEX Variant (Ref: A629280213C)** has been assessed and is considered capable for use in a low demand Safety Function up to SIL 1, in terms of random hardware reliability and architectural constraints.

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

- Random Hardware Failure (Predicted PFD $<2.0E-02$) with a Mean Down Time (MDT) of 168 hours, a Proof Test Interval (PTI) of 6 months (4380 hours) to be within 20% of the SIL 1 band, a Proof Test Coverage (PTC) of 100% and an Overhaul Interval of 10 years (87600 hours);
 - If PFD target is relaxed to 25% of the SIL 1 band (i.e. $2.5E-02$ with a Predicted PFD $<2.5E-02$), the random hardware reliability can be met with a PTI of 3 months (2190 hours) and a PTC of 95%.
- Architectural Constraint (Type B SFF 60% - 90%).

The product was assessed against the following failure mode:

- Failure to detect presence of chemical substance within the configured concentration limits.

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

- **Engineering Safety Consultants (ESC) Ltd Report: L074_FM001 rev. 1.**

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

Assessment Date: May 2021, valid to May 2023

Certificate: L074_CT001 rev. 1

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