IEC 61508 Safety Integrity Level Capability Certificate

Functional Safety of Safety-Related Programmable Electronic Systems

The **Michell Instruments UK Ltd, XTP601 Process Oxygen Analyser, XTC601 Binary Gas Analyser & XPM601 Paramagnetic Gas Analyser** have been assessed and are considered capable for use in a low demand Safety Function up to (and including) SIL 2 capability with regards to systematic, random hardware failures and architectural constraints.

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

- **Environmental Resources Management Ltd Report: H215_FM001 rev. 5.**

The products were assessed against the following failure modes:

- **XTP601: Ability to detect oxygen presence within another gas stream and generate a 4-20mA output;**
- **XTC601 & XPM601: Ability to detect target gas in another gas stream and generate a 4-20mA output.**

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

- SIL 2 with a HFT = 0 via Route 1_H;
- Architectural Constraint (Type B, SFF >90%, <99%), HFT = 0;
- Systematic Capability of SIL 2 capability against IEC 61508 (2010 Edition) via Route 2_S.

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required PFD / PFH, considering any redundancy, Proof Test Interval (PTI), Proof Test Coverage (PTC), Mission Time and Mean Time To Restoration (MTTR) for all elements included in the SIF. Each subsystem should be verified to ensure compliance with the minimum HFT requirements.

Device	λ_S (/hr)	λ_{DD} (/hr)	λ_{DU} (/hr)	SFF	Type	Estimated SIL Capability (Arch. Constraints)
XTP601	1.6E-07	7.4E-07	5.4E-08	94%	B	2
XTC601	1.6E-07	7.0E-07	3.9E-08	96%	B	2
XPM601	1.6E-07	6.8E-07	3.9E-08	96%	B	2

IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the devices. 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.

Partner: Simon Burwood
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ENVIRONMENTAL RESOURCES MANAGEMENT LTD
2nd Floor, Exchequer Court, 33 St. Mary Axe,
London, EC3A 8AA UK
Telephone: +44 (0)20 8542 2807
Registered in England and Wales: 7006868
Registered Office: 33 St. Mary Axe, London, EC3A 8AA