

## SIL CERTIFIED/RATED FIRE AND GAS SYSTEMS - DEVICE SELECTION

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When selecting a detection device to achieve a Safety Instrumented Function (SIF) within a Fire and Gas System (FGS), there are many options in the marketplace. Various statements are made by device manufacturers as to the suitability of their product including "Certified to SIL X", "SIL X Rated", "FIT for Use in SIL X", "Suitability Level SIL X" or "Compliant to SIL X". Understandably, this has caused a certain amount of confusion for end users.

Certified devices have passed an assessment on the management system, hardware and embedded software that shows adherence to the requirements of IEC 61508 Parts 1, 2 and 3. A rated, suitable for use, fit for use or compliant device meets IEC 61508 Part 2 requirements for hardware architectural constraints in terms of Safe Failure Fraction (SFF) and Probability of Failure on Demand or per Hour (PFD or PFH) requirements quantified by a Failure Mode Effects and Diagnostic Analysis (FMEDA).

ISA84.01-2004 and IEC 61511:2004 - Functional safety – Safety Instrumented System (SIS) for the Process Industry Sector provides two means for selecting a device to be used in a Safety Instrumented Function. First, the selection of a device can be based on prior use/proven-in-use which shows evidence of suitability by consideration of the manufacturers quality management system, adequate identification and specification, demonstration of performance in similar operating profiles and physical environments and volume of operating experience. Secondly, the selection can be based on the device being designed for compliance to IEC 61508. The system designer can make this determination themselves, or use evidence provided by the vendor or a third party certification body. It should be made clear that in order to achieve a SIL certified system, the devices themselves do not have to be certified.

When making FGS device selection based solely on IEC 61508 certification, system designers should recognize the inherent limitations. In contrast to logic solvers, where systematic software failure poses the greatest risk, fire and gas detectors are much more prone to common cause failures and nuisance alarms due to electromagnetic interference, environmental conditions and installation arrangements.

The ultimate question a system designer should ask is "Does the device offer the required level of protection for my facility?" Naturally, the best methodology for the selection of a fire and gas detection device is a balanced approach between IEC 61508 compliance and proven-in-use data, which should be further supported by third party verification to recognized performance standards. It is critical that, in addition to the analysis of failure data, diagnostic coverage and safe failure fraction, system designers place special emphasis on the performance boundaries of the device.

Net Safety Monitoring SIL2 Rated products are verified by TÜV SÜD, a Nationally Recognized Testing Laboratory in the US, a Standards Council of Canada certified agency and a European notified body. All Net Safety Monitoring SIL Rated products exceed the performance requirements set by IEC, CSA, FM and/or ISA standards.

*References: IEC 61511:2004 Functional safety – Safety Instrumented System (SIS) for the Process Industry Sector  
ANSI/ISA-84.00.01-2004 Functional Safety: Safety Instrumented Systems for the Process Industry Sector  
ISA-TR84.00.04-2005 Part 1: Guidelines for the Implementation of ANSI/ISA-84.00.01-2004 (IEC 61511 Mod)*