

Functional Safety and SIL

- What It Means to the Customer

Introduction

The adoption of functional safety standards continues to grow rapidly worldwide. This trend is especially evident in process industries. Risk factors such as injury to personnel, production down time, environmental damage, litigation costs and tarnished corporate image have become more visible. At the same time, tolerance of these risks has decreased. Organizations are rapidly realizing the benefits of having high performance instruments that integrate seamlessly into the overall Safety Instrumented System (SIS).

IEC 61508

The IEC 61508 standard provides a set of requirements and recommendations to promote functional safety in electrical/electronic/programmable electronic safety-related systems. One aspect of this is a process to determine the performance of a safety function. Safety Integrity Level (SIL) is a measure of the probability that the safety function may fail in a dangerous manner. The SIL value can range from 1 (the lowest integrity) to 4 (the highest integrity). Further more, the safety system is separated into two modes of operation: low demand mode of operation, which gives a probability of failure to perform the designed function on demand, and high demand, or continuous, mode of operation which measures the probability of failure per hour.

With any flame or gas detection system, the major risk factor is the failure of the system to detect or act upon, in real time, the presence of flame or gas. This requires systems that provide for continuous monitoring and near instantaneous signaling of alarm conditions.

Maximizing the availability of an instrument that is part of a SIS is absolutely critical given that the system may be kept in operation around the clock for many years. The value proposition

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of a SIL rated product is that it ensures the product has met the hardware architectural constraints for a determined Safe Failure Fraction (SFF). A common SIL value for instruments used in the detection of flame and gas is SIL 2 which equates to a SFF between 90 % to 99 % and a probability of dangerous failure per hour between 10^{-7} to 10^{-6} .

References:

IEC 61508: Functional safety of electrical/electronic/programmable electronic safety-related systems

HEADQUARTERS

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