API 670 Machinery Protection certification

INTRODUCTION:

Functional safety is a critical concern in the industrial sector, especially in specific fields such as electrical, chemical, or petroleum industries. It must be governed by specific regulations and standards at every phase and application. **The API 670 standard stands out as one of the most widely recognized documents in this regard.**

API 670, in conjunction with other standards, defines the rules for **designing, implementing, and operating safety systems in critical machinery installations.** Its primary focus is on identifying and mitigating potential risks and their impact in high-risk environments, ultimately safeguarding both individuals and the facilities.

The Scope of API 670

what does API 670 entail exactly?

Beyond the general aspects covered in other safety regulations, this standard centers on a specific aspect of the industrial sector: machine protection systems (MPS).

Functional safety relies on precise measurement systems, including parameters like position, speed (and over-speed), phase reference, vibration, temperature, or piston rod drop. **API 670 also provides specific guidelines for sensors and monitoring devices**, as well as their design, implementation, and maintenance.

Objectives of the API 670 Standard

The primary objective of this standard is to reduce the typical risks associated with machinery use in industrial installations, achieved through the formulation of standards for design and implementation. Additionally, it aims to identify, prevent, and ideally eliminate these hazards altogether.

API 670 and Complementary Standards

To achieve these objectives, **API 670 is complemented by other standards**, with two of the primary supporting documents being IEC 61508 and IEC 61511. These **international standards**,

developed by the International Electrotechnical Commission (IEC), play distinct roles in functional safety, addressing interconnected processes and facilities.

IEC 61508 Standard

IEC 61508 is probably **the main standard in the field of functional safety, specifically dedicated to electrical,** electronic and programmable electronic systems in the industrial sector. It is an internationally implemented standard and is followed in all organisations whose activity involves certain risks in this respect.

IEC 61511 Standard

From the previous document, the IEC 61511 standard was also born, developed by the same organisation and **focused in this case on another key aspect of functional safety, such as industrial processes.** Although it was published later, it has reached a similar level of relevance to IEC 61508, and has therefore also spread globally.

Key Concepts in API 670

To grasp the API 670 standard fully, it's essential to explore key concepts integral to the document. These concepts are fundamental in the entire lifecycle of designing, implementing, using, and maintaining safety systems for critical industrial machinery.

Environmental Requirements

API 670 emphasizes that when designing and implementing a functional safety system for machinery protection, environmental factors in hostile conditions must be considered. This includes factors such as humidity, chemical resistance, shock conditions, or temperature.

Efficient Strategy Design

Efficient prevention and swift response to hypothetical incidents are paramount in complex functional safety environments. **API 670 highlights this by offering guidance on effective alarm operation,** response times, and immediate corrective actions to minimize impact and consequences.

Segregation and Independence of Protection Systems

Another crucial aspect in API 670 is the separation of protection systems, both externally from other devices and internally concerning the components they consist of. This applies not only to safety equipment but also to monitoring, control, and maintenance devices.

When API 670 Must Be Applied

To fully **comprehend the API 670 standard and its application in functional safety and critical machinery,** it's essential to consider the situations where the standard is inevitably applicable. As always, aspects like risk identification, risk levels, system requirements, and operation are of paramount importance.

Risk Identification and Impact

When designing an industrial process involving various types of machinery, it's essential to parallelly design a functional safety system. In this regard, **identifying risks and assessing the impact of their consequences plays a pivotal role as per the standard.**

Establishing Safety System Requirements

Based on the risks identified earlier, **API 670 recommends establishing specific safety requirements for each system, making their implementation mandatory.** These requirements must precisely align with the relevant standards in each case.

Verifying Safety Integrity Level

The Safety Integrity Level (SIL) is a critical factor in functional safety. **The standard establishes parameters for identifying each point in the system based on its level of hazard,** applying a corresponding instrumented safety system appropriate to the represented risk.

Operation and Maintenance of Functional Safety Systems

Organizations dealing with critical machinery must ensure proper management of safety systems. This encompasses correct usage and periodic maintenance of devices. As a result, **inspections, monitoring, and audits are also integral aspects of API 670.**