

FAQ SHEET - PROCESS HAZARD AND RISK ASSESSMENT IN IEC 61511 / ISA 84

Acronyms and Abbreviations Used

HAZOP	-	Hazard and Operability Study
IEC	-	International Electrotechnical Commission
ISA	-	The Instrumentation, Systems and Automation Society
LOPA	-	Layers of Protection Analysis
PHA	-	Process Hazard Analysis
PHRA	-	Process Hazard and Risk Assessment
SIF	-	Safety Instrumented Function

What is PHRA?

IEC 61511 / ISA 84 requires a process hazard and risk assessment (PHRA) be carried out to define the safety functional requirements and determine safety integrity levels (SILs) for each safety instrumented function (SIF) for a process. Hazards must be identified, risks evaluated, and the necessary risk reduction determined.

What are the objectives of PHRA?

To determine the following items:

- Hazards and hazardous events of the process and associated equipment
- Sequence of events leading to the hazardous event
- Factors that contribute to hazardous events, including human errors
- Consequences and likelihoods of the hazardous events
- Process risks associated with the hazardous events
- Any requirements for risk reduction
- Safety functions required to achieve the necessary risk reduction
- If any of the safety functions are SIFs
- SILs for SIFs

What PHRA methods can be used?

Process hazard analysis (PHA) is used to identify hazardous events. Methods such as the Hazard and Operability Study (HAZOP) and What If analysis are employed. SIL determination for SIFs either is integrated with PHA or conducted as a separate study. Methods used for SIL determination depend primarily on whether the necessary risk reduction is specified in numerically or qualitatively. The IEC 61511 / ISA 84 standard identifies options for SIL determination including risk matrix, risk graph, layers of protection analysis (LOPA), and semi-quantitative methods. Any technique that is considered to be effective may be used provided that it results in a clear description of

safety functions and associated levels of performance.

How can I get more information?

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