1 Scope

1.1 ISA-TR84.00.02-2002 - Part 2 is informative and does not contain any mandatory requirements. This part of the technical report is intended to be used only after a thorough understanding of ISA-TR84.00.02-2002 – Part 1, which defines the overall scope. ISA-TR84.00.02-2002 - Part 2 provides:

a) technical guidance in Safety Integrity Level (SIL) Analysis;

b) ways to implement Safety Instrumented Functions (SIF) to achieve a specified SIL;

c) failure rates and failure modes of SIF components;

d) diagnostics, diagnostic coverage, covert faults, test intervals, redundancy of SIF components;

e) tool(s) for SIL verification of SIF.

1.2 ISA-TR84.00.02-2002 - Part 2 provides one possible technique for calculating PFD_{avg} values for Safety Instrumented Functions (SIF) installed in accordance with ANSI/ISA-84.01-1996, “Application of Safety Instrumented Systems for the Process Industries”.

1.3 ISA-TR84.00.02-2002 - Part 2 provides the engineer(s) performing design for a SIF with a relatively simple technique generally following the simplified equation approach for assessing the capability of the designed SIF.

1.4 The procedures outlined in ISA-TR84.00.02-2002 - Part 2 provide the engineer with steps to follow in estimating a mathematical value for PFD_{avg} for typical configurations of SIF designed according to ANSI/ISA-84.01-1996. This procedure is appropriate for SIL 1 and SIL 2 SIFs. This procedure should not be used for SIL 3 SIFs unless the User has a thorough understanding of the SIL Verification mathematics and fully understands the limitations of the simplified equations.

1.5 ISA-TR84.00.02-2002 - Part 2 does not cover modeling of external communications or operator interfaces. The SIL analysis includes the SIF envelope as defined by ANSI/ISA-84.01-1996 (see Figure I.2).

2 References

1. ANSI/ISA-84.01-1996 “Application of Safety Instrumented Systems for the Process Industries”, Instrumentation, Systems, and Automation Society, ISA, Research Triangle Park, NC, 27709, February 1996.

2. ISA-TR84.00.02-2002, "Safety Instrumented Functions (SIF) – Safety Integrity Level Evaluation Techniques, Part 1: Introduction; Part 2: Determining the SIL of a SIF via Simplified Equations; Part 3: Determining the SIL of a SIF via Fault Tree Analysis; Part 4: Determining the SIL of a SIF via Markov Analysis; Part 5: Determining the PFD of SIS Logic Solvers via Markov Analysis," Instrumentation, Systems and Automation Society, Technical Report, Research Triangle Park, NC, 27709, 2002.

3. “Reliability, Maintainability and Risk” by David J. Smith, 4th Edition, 1993, Butterworth-Heinemann, ISBN 82-515-0188-1.

4. “Guidelines for Safe Automation of Chemical Processes”, Center for Chemical Process Safety, American Institute of Chemical Engineers, New York, NY 10017, 1993.