1 Purpose

ANSI/ISA-84.01-1996 has been retired and replaced with ANSI/ISA-84.00.01-2004 Parts 1-3 (IEC 61511 Mod). The new standard is the ANSI/ISA adoption of the international standard, IEC 61511, and includes one additional clause, a grandfather clause covering existing SIS (ANSI/ISA-84.00.01-2004 Part 1 Clause 1.0 y).

This technical report is divided into two parts.

- Part 1 provides guidance on a wide range of topics related to the standard.
- Part 2 provides a single user example to illustrate some of the lifecycle steps in ANSI/ISA-84.00.01-2004.

ISA-TR84.00.04 Part 1 (ISA-TR84.00.04-1) contains four main clauses.

- Clause 1 is the purpose.
- Clause 2 explains the origins of the new standard and discusses its relationship to other regulations, standards, and practices.
- Clause 3 and Annex A specifically address the grandfather clause and provide guidance on the evaluation of existing SIS.
- Clause 4 provides an overview of the SIS lifecycle and references to subject-specific annexes for additional guidance on key issues.

There is nothing in this guideline that precludes, replaces, or makes obsolete any requirement of ANSI/ISA-84.01-1996 or ANSI/ISA-84.00.01-2004-1. This guideline is a "how to" approach and provides informative, non-mandatory methods.

2 Introduction

In the United States of America, the Occupational Safety and Health Administration (US-OSHA) regulation, 29CFR1910.119 (OSHA 1910.119), requires the identification and management of the instrumented systems responsible for safe operation. ISA Standards Panel 84 (ISA84) developed ANSI/ISA-84.01-1996 to define how to manage Safety Instrumented Systems (SIS) using a lifecycle approach. The standard provided a formal, documented process for addressing the design, operation, maintenance, testing and management of change for SIS. The efforts of the ISA84 committee resulted in US-OSHA recognizing ANSI/ISA-84.01-1996 as representing good engineering practices for SIS.

During its initial development, the ISA84 committee relied on existing US functional safety practices, such as those documented in OSHA 1910.119 and by the Center for Chemical Process Safety (CCPS) *Guidelines for the Safe Automation of Chemical Processes.* Working in parallel to the ISA84 committee effort, the International Electrotechnical Commission (IEC) was developing IEC 61508. Concepts introduced in the draft international standard were incorporated into ANSI/ISA-84.01-1996, resulting in ANSI/ISA-84.01-1996 being accepted as the US functional safety standard for the process sector. Through ANSI/ISA-84.01-1996, owners/operators have become familiar with terms, such as safety integrity levels, safety instrumented systems, and safety functions (i.e., safety instrumented function).

Since 1996, some countries have utilized ANSI/ISA-84.01-1996, while others have used their own national standard or adopted IEC 61508 when it was released in 1999. In an era where design, engineering, and operation can occur in multiple countries, this diversity of standards resulted in an immediate need for an international, consensus process-sector standard.

The IEC 61511 committee was formed to specifically address the process sector under the framework of IEC 61508. This international consensus standard was issued in 2003. With the completion of IEC 61511, the ISA84 committee accepted IEC 61511 as ISA-84.00.01-2004 (IEC 61511 modified). Once the standard was accepted by ISA, the ISA84 committee immediately initiated the development of this guideline. ANSI approved the new standard as ANSI/ISA-84.00.01-2004 in September 2004.

- The 1st edition of ISA-TR84.00.04 was intended for readers who were familiar with ANSI/ISA 91.00.01-2001, ANSI/ISA-84.01-1996, ISA-TR84.00.02, ISA-TR84.00.03, and ANSI/ISA-84.00.01-2004 (IEC 61511 modified).

- ISA-TR84.00.04-1 Annex S provides an overview of the differences between ISA-84.01-1996 and ISA-84.00.01-2004.

- This 2nd edition of ISA-TR84.00.04-1 amends and updates some guidance, but predominantly expands guidance related to user approval (Annex L), setpoint determination (Annex Q), and performance metrics (Annex R). Additional guidance on applying SIS as well as instrumented protective systems can be found in CCPS *Guidelines for Safe and Reliable Instrumented Protective Systems*, published in 2007.

3 Grandfather clause

The concept of the grandfather clause in ANSI/ISA-84.00.01-2004-1 originated with OSHA 1910.119. The grandfather clause's intent is to recognize prior good engineering practices (e.g., ANSI/ISA-84.01-1996) and to allow their continued use with regard to existing SIS.

The grandfather clause (ANSI/ISA-84.00.01-2004-1 Clause 1.0 y) states: “For existing SIS designed and constructed in accordance with codes, standards, or practices prior to the issuance of this standard (e.g. ANSI/ISA-84.01-1996), the owner/operator shall determine that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.”

NOTE For more detail, see OSHA 29CFR 1910.119 (d) (iii).

The grandfather clause establishes that the owner/operator of an SIS designed and constructed prior to the issuance of the standard should demonstrate that the “equipment is designed, maintained, inspected, tested and operating in a safe manner.” There are two essential steps:

1) Confirm that a hazard and risk analysis has been done to determine qualitatively or quantitatively the level of risk reduction needed for each Safety Instrumented Function (SIF) in the SIS.

2) Confirm that an assessment of the existing SIF has been performed to determine that it delivers the needed level of risk reduction.

   NOTE The evaluation of the SIF should take into account various factors, such as device failure rates and associated design, operation, maintenance, testing, inspection and management-of-change practices.

If the above activities have not been done, they should be scheduled for review at the next appropriate opportunity. Various considerations related to timing are discussed in ISA-TR84.00.04-1 Annex A.2.

The grandfather clause releases the owner/operator from the design and construction requirements of ANSI/ISA-84.00.01-2004-1 for existing installations if they can demonstrate these criteria. This leads to questions regarding how to demonstrate compliance with the grandfather clause and at what point modifications to the process or the SIS have become significant enough to warrant reassessment of the adequacy of the SIS.