TECHNICAL REPORT

ISA-TR18.02-2016

**Alarm Identification
and Rationalization**

**Approved 29 June 2016**

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Foreword

In June of 2009, ANSI/ISA-18.02-2009 Management of Alarm Systems for the Process Industries, commonly referred to as ISA-18.2 was issued. In that same year the ISA18 committee established six working groups to develop a series of technical reports with guidance on how to implement the practices outlined in ISA-18.2.  In 2012, a seventh working group was also added. In 2016, a revision of ISA-18.2 was published as ANSI/ISA-18.02-2016.

 The technical reports are each listed below with a brief overview:

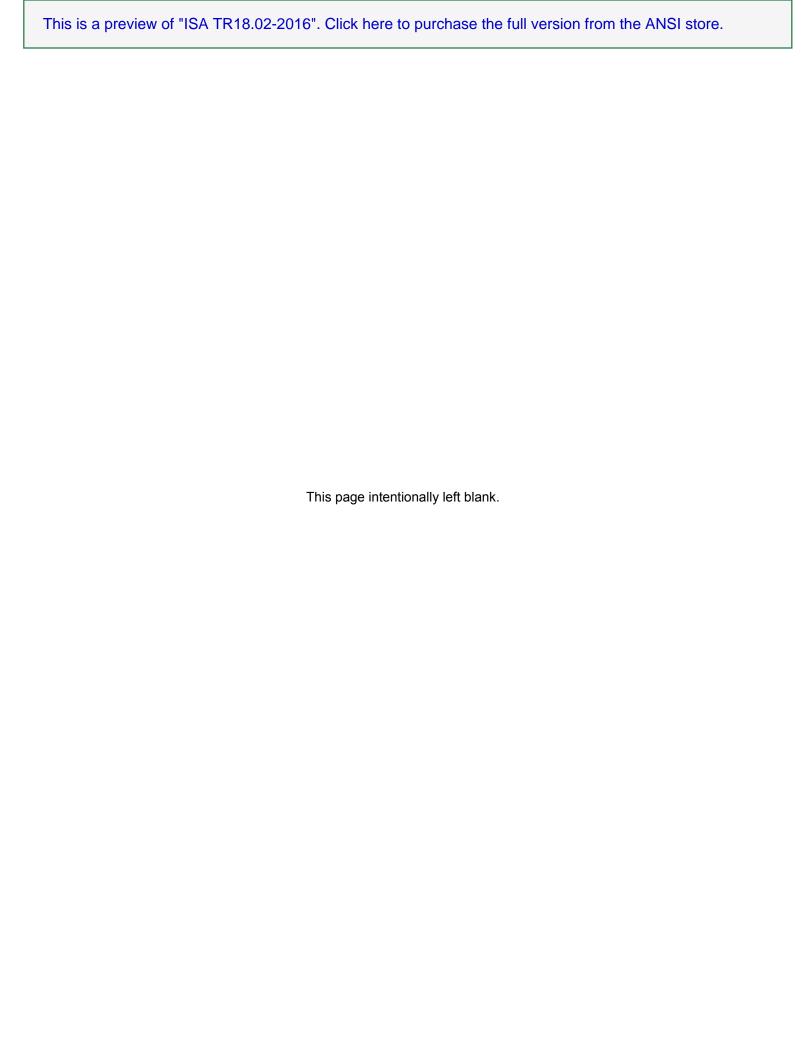- TR1 – Alarm Philosophy – provides guidance on the alarm philosophy.  TR1 is limited to the scope of ANSI/ISA-18.02Clause 6.  The alarm philosophy provides guidance for successful management of the alarm system.  It covers the definitions, principles, and activities by providing overall guidance on methods for alarm identification, rationalization, classification, prioritization, monitoring, management of change, and audit.

- TR2 – Alarm Identification and Rationalization – provides guidance on alarm identification and rationalization.  TR2 is limited to the scope of ANSI/ISA-18.02- Clauses 8 and 9.  Identification and rationalization covers the processes to determine the possible need for an alarm or a change to an alarm, systematically compare alarms to the alarm philosophy and determine the alarm setpoint, consequence, operator action, priority, and class. Activities include, but are not limited to, identification, justification, prioritization, classification, and documentation.

- TR3 – Basic Alarm Design – provides guidance on basic alarm design.  TR3 focuses on the scope of ANSI/ISA-18.02- Clause 10 and may include other clauses as needed (e.g., operations and maintenance).  Basic alarm design covers the selection of alarm attributes (e.g., types, deadbands, and delay times) and may be specific to each control system.

- TR4 – Enhanced and Advanced Alarm Methods – provides guidance on advanced and enhanced alarm methods.  TR4 focuses on the scope of ANSI/ISA-18.02- Clause 12.  Enhanced alarm design covers guidance on additional logic, programming, or modeling used to modify alarm behavior.  These methods may include: dynamic alarming, state-based alarming, adaptive alarms, logic-based alarming, predictive alarming, as well as most of the designed suppression methods.

- TR5 – Alarm Monitoring, Assessment, and Audit – provides guidance on monitoring, assessment and audit of alarms.  TR5 focuses on the scope of ANSI/ISA-18.02- Clauses 16 and 18.  Monitoring, assessment, and audit cover the continuous monitoring, periodic performance assessment, and recurring audit of the alarm system.

- TR6 – Alarm Systems for Batch and Discrete Processes – provides guidance on the application of ANSI/ISA-18.02- alarm life cycle activities to batch and discrete processes, expanding on multiple clauses of ANSI/ISA-18.02-.

- TR7 – Alarm Management when Utilizing Packaged Systems – provides guidance on the application of ANSI/ISA 18.2- to plants utilizing packaged systems, expanding on multiple clauses of ANSI/ISA-18.02-.

Each technical report is written to be a standalone document.  In an effort to minimize repetition, the technical reports have cross references.

The guidance as presented in this document is general in nature, and should be applied to each system as appropriate by personnel knowledgeable in the manufacturing process and control systems to which it is being applied.

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## 1   Scope

### 1.1   General

This technical report was written in support of the standard ANSI/ISA-18.2-2016, Management of Alarm Systems for the Process Industries (March 2016), commonly referred to as ISA-18.2.

This technical report provides guidance, rationale, and examples for the identification and rationalization life cycle stages from ISA-18.2.

a) Identification - Identification is a general term for the different methods that can be used to determine the possible need for an alarm or a change to an alarm. The identification stage is the input point of the alarm lifecycle for recommended alarms or alarm changes. Identified alarms are an input to rationalization.

b) Rationalization – Rationalization encompasses several significant activities, including alarm justification, documentation, prioritization, and classification. In justification, existing or potential alarms are systematically compared to the criteria for alarms set forth in the alarm philosophy. If the proposed alarm meets the criteria, then the alarm type, setpoint, cause, consequence, and operator action are documented. The alarm is prioritized and classified according to the philosophy. Classification encompasses assigning alarms to a group or class defining certain administrative requirements. These activities are often combined into a single rationalization activity. They do not need to be conducted in separate sessions.

### 1.2   Applicability

This technical report addresses alarm identification and rationalization for facilities in the process industries for a variety of purposes which include, but are not restricted to, improving safety, environmental protection, product quality, equipment protection, and plant productivity. The methods described herein are applicable to batch and discrete processes as well as continuous processes. There may be some further considerations needed for batch and discrete processes (e.g., time varying setpoints and need to suppress alarms for certain batch steps).  For those further considerations see TR6. For additional guidance with respect to packaged systems see TR7.

The application of the material in this report will vary with the type of alarm management effort being undertaken.

a) New facility (unit or plant) – Alarm rationalization for a new facility can be challenging since the team cannot draw upon alarm history or facility operating experience. Input from operators will have to be from those who have worked on comparable processes. As such, additional process engineering input may be needed to augment the lack of operational experience. In some situations, some alarms may need to be rationalized a second time as part the continuous improvement process once there is more operating experience with the facility. A post startup audit may highlight the need for improvement to meet target metrics.

b) Control system upgrade – The lack of experience with the alarm management capabilities of the new control system may mean that additional training could be necessary before beginning the rationalization effort. In particular, the project team will need to understand the options for configuration of alarms, the human machine interface, etc.

c) Existing control system – Existing systems may have issues, including: the potential for poor or nonexistent documentation of the basis of the existing alarm configuration, excessive or unneeded alarms, and inconsistencies in the approaches for creation of alarms. See 9.4 for more details. However, on existing systems it is usually possible to examine alarm performance data to identify various types of problematic alarms.

## 2   Normative references

ANSI/ISA–18.2–2016 *Management of Alarm Systems for the Process Industries* [ISA-18.2]