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TECHNICAL REFERENCE

Industrial communication networks – Network and system security

– Part 1-1 : Terminology, concepts and models

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National Foreword

This Technical Reference (TR) was prepared by the Working Group on Cyber Security for Industrial Automation set up by the Technical Committee on Smart Manufacturing under the purview of the Manufacturing Standards Committee.

This TR is an identical adoption of IEC/TS 62443-1-1:2009, “Industrial communication networks – Network and system security – Part 1-1 : Terminology, concepts and models”, published by the International Electrotechnical Commission.

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TECHNICAL SPECIFICATION

colour inside

Industrial communication networks – Network and system security – Part 1-1: Terminology, concepts and models

IEC/TS 62443-1-1:2009(E)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – NETWORK AND SYSTEM SECURITY –

Part 1-1: Terminology, concepts and models

FOREWORD

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62443-1-1, which is a technical specification, has been prepared by IEC technical committee 65: Industrial-process measurement, control and automation.

This technical specification is derived from the corresponding US ANSI/S99.01.01 standard.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
65/423/DTS	65/432A/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 62433 series, published under the general title *Industrial communication networks – Network and system security*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

NOTE The revision of this technical specification will be synchronized with the other parts of the IEC 62443 series.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

The subject of this technical specification is security for industrial automation and control systems. In order to address a range of applications (i.e., industry types), each of the terms in this description have been interpreted very broadly.

The term “Industrial Automation and Control Systems” (IACS), includes control systems used in manufacturing and processing plants and facilities, building environmental control systems, geographically dispersed operations such as utilities (i.e., electricity, gas, and water), pipelines and petroleum production and distribution facilities, and other industries and applications such as transportation networks, that use automated or remotely controlled or monitored assets.

The term “security” is considered here to mean the prevention of illegal or unwanted penetration, intentional or unintentional interference with the proper and intended operation, or inappropriate access to confidential information in IACS. Cybersecurity which is the particular focus of this technical specification, includes computers, networks, operating systems, applications and other programmable configurable components of the system.

The audience for this technical specification includes all users of IACS (including facility operations, maintenance, engineering, and corporate components of user organizations), manufacturers, suppliers, government organizations involved with, or affected by, control system cybersecurity, control system practitioners, and security practitioners. Because mutual understanding and cooperation between information technology (IT) and operations, engineering, and manufacturing organizations is important for the overall success of any security initiative, this technical specification is also a reference for those responsible for the integration of IACS and enterprise networks.

Typical questions addressed by this technical specification include:

a) What is the general scope of application for IACS security?

b) How can the needs and requirements of a security system be defined using consistent terminology?

c) What are the basic concepts that form the foundation for further analysis of the activities, system attributes, and actions that are important to provide electronically secure control systems?

d) How can the components of an IACS be grouped or classified for the purpose of defining and managing security?

e) What are the different cybersecurity objectives for control system applications?

f) How can these objectives be established and codified?

Each of these questions is addressed in detail in subsequent clauses of this technical specification.

INDUSTRIAL COMMUNICATION NETWORKS – NETWORK AND SYSTEM SECURITY –

Part 1-1: Terminology, concepts and models

1 Scope

1.1 General

This part of the IEC 62443 series is a technical specification which defines the terminology, concepts and models for Industrial Automation and Control Systems (IACS) security. It establishes the basis for the remaining standards in the IEC 62443 series.

To fully articulate the systems and components the IEC 62443 series address, the range of coverage may be defined and understood from several perspectives, including the following:

a) range of included functionality;

b) specific systems and interfaces;

c) criteria for selecting included activities;

d) criteria for selecting included assets.

Each of these is described in the following subclauses:

1.2 Included functionality

The scope of this technical specification can be described in terms of the range of functionality within an organization’s information and automation systems. This functionality is typically described in terms of one or more models.

This technical specification focuses primarily on industrial automation and control, as described in a reference model (see Clause 6). Business planning and logistics systems are not explicitly addressed within the scope of this technical specification, although the integrity of data exchanged between business and industrial systems is considered.

Industrial automation and control includes the supervisory control components typically found in process industries. It also includes SCADA (Supervisory Control and Data Acquisition) systems that are commonly used by organizations that operate in critical infrastructure industries. These include the following:

a) electricity transmission and distribution;

b) gas and water distribution networks;

c) oil and gas production operations;

d) gas and liquid transmission pipelines.

This is not an exclusive list. SCADA systems may also be found in other critical and non-critical infrastructure industries.

1.3 Systems and interfaces

In encompassing all IACS, this technical specification covers systems that can affect or influence the safe, secure, and reliable operation of industrial processes. They include, but are not limited to: