SVENSK STANDARD SS-EN IEC 62443-3-3

Fastställd	Utgåva	Sida	Ansvarig kommitté
2019-06-12	1	1 (1+82)	SEK TK 65

IT-säkerhet i industriella automationssystem – Del 3-3: IT-säkerhet i nät och system – Fordringar på systemets säkerhet och på säkerhetsnivåer

Industrial communication networks –
Network and system security –
Part 3-3: System security requirements and security levels

Som svensk standard gäller europastandarden EN IEC 62443-3-3:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62443-3-3:2019.

Nationellt förord

Europastandarden EN IEC 62443-3-3:2019

består av:

- **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
- **IEC 62443-3-3, First edition, 2013 - Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 25.040.40; 35.110.00

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62443-3-3

April 2019

ICS 25.040.40; 35.110

English Version

Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels (IEC 62443-3-3:2013)

Réseaux industriels de communication - Sécurité dans les réseaux et les systèmes - Partie-3: Exigences relatives à la sécurité dans les systèmes et niveaux de sécurité
(IEC 62443-3-3:2013)

Industrielle Kommunikationsnetze - IT-Sicherheit für Netze und Systeme - Teil 3-3: Systemanforderungen zur IT-Sicherheit und Security-Level
(IEC 62443-3-3:2013)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 62443-3-3:2019 E

European foreword

This document (EN IEC 62443-3-3:2019) consists of the text of IEC 62443-3-3:2013 prepared by IEC/TC 65 "Industrial-process measurement, control and automation".

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2020-04-03
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2022-04-03

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62443-3-3:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 62443-2-4	NOTE	Harmonized as EN IEC 62443-2-4
IEC 62443-4-1	NOTE	Harmonized as EN IEC 62443-4-1
IEC 62443-4-2	NOTE	Harmonized as EN IEC 62443-4-2
ISO/IEC 27002	NOTE	Harmonized as EN ISO/IEC 27002

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 62443-2-1	-	Industrial communication networks -- Network and system security - Part 2-1: Establishing an industrial automation and control system security program	-	-
IEC/TS 62443-1-1	2009	Industrial communication networks -- Network and system security - Part 1-1: Terminology, concepts and models	-	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL COMMUNICATION NETWORKS – NETWORK AND SYSTEM SECURITY –

Part 3-3: System security requirements and security levels

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62443-3-3 has been prepared by IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this standard is based on the following documents:

FDIS	Report on voting
65/531/FDIS	65/540/RVD

Full information on the voting for the approval of this standard 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 in the IEC 62443 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 stability 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

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 document using a colour printer.

0 Introduction

0.1 Overview

NOTE 1 This standard is part of series of standards that addresses the issue of security for industrial automation and control systems (IACS). It has been developed by working group 4, task group 2 of the IEC99 committee in cooperation with IEC TC65/WG10. This document prescribes the security requirements for control systems related to the seven foundational requirements defined in IEC 62443‑1‑1 and assigns system security levels (SLs) to the system under consideration (SuC).

NOTE 2 The format of this standard follows the ISO/IEC requirements discussed in ISO/IEC Directives, Part 2 [11].[1] These directives specify the format of the standard as well as the use of terms like “shall”, “should”, and “may”. The requirements specified in normative clauses use the conventions discussed in Appendix H of the ISO/IEC Directives.

Industrial automation and control system (IACS) organizations increasingly use commercial-off-the-shelf (COTS) networked devices that are inexpensive, efficient and highly automated. Control systems are also increasingly interconnected with non-IACS networks for valid business reasons. These devices, open networking technologies and increased connectivity provide an increased opportunity for cyber attack against control system hardware and software. That weakness may lead to health, safety and environmental (HSE), financial and/or reputational consequences in deployed control systems.

Organizations deploying business information technology (IT) cyber security solutions to address IACS security may not fully comprehend the results of this decision. While many business IT applications and security solutions can be applied to IACS, they need to be applied in an appropriate way to eliminate inadvertent consequences. For this reason, the approach used to define system requirements needs to be based on a combination of functional requirements and risk assessment, often including an awareness of operational issues as well.

IACS security measures should not have the potential to cause loss of essential services and functions, including emergency procedures. (IT security measures, as often deployed, do have this potential.) IACS security goals focus on control system availability, plant protection, plant operations (even in a degraded mode) and time-critical system response. IT security goals often do not place the same emphasis on these factors; they may be more concerned with protecting information rather than physical assets. These different goals need to be clearly stated as security objectives regardless of the degree of plant integration achieved. A key step in risk assessment, as required by IEC 62443‑2‑1[2], should be the identification of which services and functions are truly essential for operations. (For example, in some facilities engineering support may be determined to be a non-essential service or function.) In some cases, it may be acceptable for a security action to cause temporary loss of a non-essential service or function, unlike an essential service or function that should not be adversely affected.

This standard assumes that a security program has been established and is being operated in accordance with IEC 62443‑2‑1. Furthermore, it is assumed that patch management is implemented consistently with the recommendations detailed in IEC/TR 62443‑2‑3 [5] utilizing the appropriate control system requirements and requirement enhancements as described in this standard. In addition, IEC 62443‑3‑2 [8] describes how a project defines risk-based security levels (SLs) which then are used to select products with the appropriate technical security capabilities as detailed in this standard. Key input to this standard included ISO/IEC 27002 [15] and NIST SP800-53, rev 3 [24] (see Clause 2 and the Bibliography for a more complete listing of source material).

[1] Numbers in square brackets refer to the Bibliography.

[2] Many documents in the IEC 62443 series are currently under review or in development.

The primary goal of the IEC 62443 series is to provide a flexible framework that facilitates addressing current and future vulnerabilities in IACS and applying necessary mitigations in a systematic, defensible manner. It is important to understand that the intention of the IEC 62443 series is to build extensions to enterprise security that adapt the requirements for business IT systems and combines them with the unique requirements for strong availability needed by IACS.

0.2 Purpose and intended audience

The IACS community audience for this standard is intended to be asset owners, system integrators, product suppliers, service providers and, where appropriate, compliance authorities. Compliance authorities include government agencies and regulators with the legal authority to perform audits to verify compliance with governing laws and regulations.

System integrators, product suppliers and service providers will use this standard to evaluate whether their products and services can provide the functional security capability to meet the asset owner's target security level (SL-T) requirements. As with the assignment of SL-Ts, the applicability of individual control system requirements (SRs) and requirement enhancements (REs) needs to be based on an asset owner's security policies, procedures and risk assessment in the context of their specific site. Note that some SRs contain specific conditions for permissible exceptions, such as where meeting the SR will violate fundamental operational requirements of a control system (which may trigger the need for compensating countermeasures).

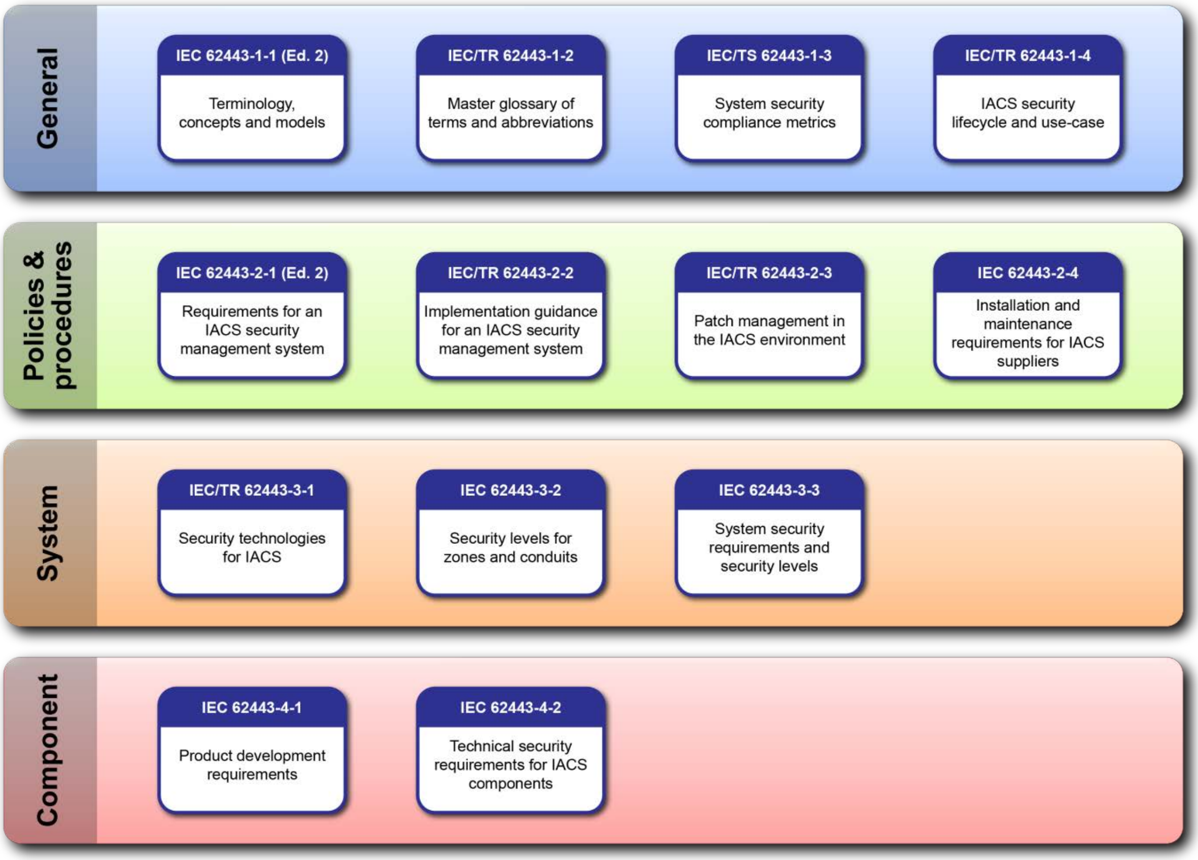
When designing a control system to meet the set of SRs associated with specific SL-Ts, it is not necessary that every component of the proposed control system support every system requirement to the level mandated in this standard. Compensating countermeasures can be employed to provide the needed functionality to other subsystems, such that the overall SL-T requirements are met at the control system level. Inclusion of compensating countermeasures during the design phase should be accompanied by comprehensive documentation so that the resulting achieved control system SL, SL-A(control system), fully reflects the intended security capabilities inherent in the design. Similarly, during certification testing and/or post-installation audits, compensating countermeasures can be utilized and documented in order to meet the overall control system SL.

There is insufficient detail in this standard to design and build an integrated security architecture. That requires additional system-level analysis and development of derived requirements that are the subject of other standards in the IEC 62443 series (see 0). Note that providing specifications detailed enough to build a security architecture are not the goal of this standard. The goal is to define a common, minimum set of requirements to reach progressively more stringent security levels. The actual design of an architecture that meets these requirements is the job of system integrators and product suppliers. In this task, they retain the freedom to make individual choices, thus supporting competition and innovation. Thus this standard strictly adheres to specifying functional requirements, and does not address how these functional requirements should be met.

0.3 Usage within other parts of the IEC 62443 series

Figure 1 shows a graphical depiction of the IEC 62443 series when this standard was written.

IEC 62443‑3‑2 uses the SRs and REs as a checklist. After the system under consideration (SuC) has been described in terms of zones and conduits, and individual target SLs have been assigned to these zones and conduits, the SRs and REs in this standard, as well as their mapping to capability SLs (SL-Cs), are used to compile a list of requirements which the control system design needs to meet. A given control system design can then be checked for completeness, thereby providing the SL-As.


General
IEC 62443-1-1 (Ed. 2)
Terminology, concepts and models
IEC/TR 62443-1-2
Master glossary of terms and abbreviations
IEC/TS 62443-1-3
System security compliance metrics
IEC/TR 62443-1-4
IACS security lifecycle and use-case
Policies & procedures
IEC 62443-2-1 (Ed. 2)
Requirements for an IACS security management system
IEC/TR 62443-2-2
Implementation guidance for an IACS security management system
IEC/TR 62443-2-3
Patch management in the IACS environment
IEC 62443-2-4
Installation and maintenance requirements for IACS suppliers
System
IEC/TR 62443-3-1
Security technologies for IACS
IEC 62443-3-2
Security levels for zones and conduits
IEC 62443-3-3
System security requirements and security levels
Component
IEC 62443-4-1
Product development requirements
IEC 62443-4-2
Technical security requirements for IACS components

IEC 2031/13

Figure 1 – Structure of the IEC 62443 series

IEC/TS 62443‑1‑3 [2] uses the foundational requirements (FRs), SRs, REs and the mapping to SL-Cs as a checklist to test for completeness of the specification of quantitative metrics. The quantitative security compliance metrics are context specific. Together with IEC 62443‑3‑2, the asset owner's SL-T assignments are translated into quantitative metrics that can be used to support system analysis and design trade-off studies, to develop a security architecture.

IEC 62443–4‑1 [9] addresses the overall requirements during the development of products. As such, IEC 62443‑4‑1 is product supplier centric. Product security requirements are derived from the list of baseline requirements and REs specified in this standard. Normative quality specifications in IEC 62443‑4‑1 will be used when developing these product capabilities.

IEC 62443‑4‑2 [10] contains sets of derived requirements that provide a detailed mapping of the SRs specified in this standard to subsystems and components of the SuC. At the time this standard was written, the component categories addressed in IEC 62443‑4‑2 were: embedded devices, host devices, network devices and applications. As such, IEC 62443‑4‑2 is vendor (product supplier and service provider) centric. Product security requirements are first derived from the list of baseline requirements and REs specified in this standard. Security requirements and metrics from IEC 62443‑3‑2 and IEC/TS 62443‑1‑3 are used to refine these normative derived requirements.

INDUSTRIAL COMMUNICATION NETWORKS – NETWORK AND SYSTEM SECURITY –

Part 3-3: System security requirements and security levels

1 Scope

This part of the IEC 62443 series provides detailed technical control system requirements (SRs) associated with the seven foundational requirements (FRs) described in IEC 62443‑1‑1 including defining the requirements for control system capability security levels, SL-C(control system). These requirements would be used by various members of the industrial automation and control system (IACS) community along with the defined zones and conduits for the system under consideration (SuC) while developing the appropriate control system target SL, SL-T(control system), for a specific asset.

As defined in IEC 62443‑1‑1 there are a total of seven FRs:

a) Identification and authentication control (IAC),

b) Use control (UC),

c) System integrity (SI),

d) Data confidentiality (DC),

e) Restricted data flow (RDF),

f) Timely response to events (TRE), and

g) Resource availability (RA).

These seven requirements are the foundation for control system capability SLs, SL-C (control system). Defining security capability at the control system level is the goal and objective of this standard as opposed to target SLs, SL-T, or achieved SLs, SL-A, which are out of scope.

See IEC 62443‑2‑1 for an equivalent set of non-technical, program-related, capability SRs necessary for fully achieving a control system target SL.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62443‑1‑1:2009, *Industrial communication networks – Network and system security – Part 1-1: Terminology, concepts and models*

IEC 62443‑2‑1, *Industrial communication networks – Network and system security – Part 2-1: Establishing an industrial automation and control system security program*