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Industrial-process measurement, control and automation – Smart manufacturing –
Part 3: Challenges for cybersecurity

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – SMART MANUFACTURING –

Part 3: Challenges for cybersecurity

FOREWORD

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IEC TR 63283-3 has been prepared by Technical Committee 65: Industrial-process measurement, control and automation. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
65/865/DTR	65/906/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 63283 series, published under the general title *Industrial-process measurement, control and automation – Smart Manufacturing*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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- withdrawn,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

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INTRODUCTION

Smart Manufacturing comes with many new challenges to cybersecurity. It starts from architectural paradigm shifts combining many valuable assets (design, production planning, engineering, supply chain management, etc.) currently enclosed into dedicated systems into one system. Many stakeholders need to cooperate and exchange information. This is enabled by the application of new information technologies such as industrial internet-of-things (IIoT), edge technology, machine learning, wireless communications and new production technologies as additive manufacturing, exposure of data belonging to contracting parties.

From the point of view of cybersecurity increasing digitalization, tight networking and interconnectivity, usage of standard IT technologies, etc., increase the attack surface and could enable new types of attack. This puts the protection goals integrity and availability of the production system, as well as confidentiality of data involved in the production process at risk. Examples are counterfeiting, loss of know-how or intellectual property, leaking of key performance indicators.

This Technical Report contains smart manufacturing challenges for cybersecurity, i.e., it identifies issues that need to be addressed/fulfilled by smart manufacturing systems in order to ensure their security.

Cybersecurity is a concern for any kind of production method such as:

- discrete manufacturing;
- continuous production;
- batch production.

The tasks of the IEC 65 WG 23 taskforce cybersecurity are:

- review smart manufacturing use cases to find cybersecurity relevant scenarios and requirements;
- if necessary, propose additional smart manufacturing use cases showing potential cybersecurity issues;
- develop a list of smart manufacturing requirements that are necessary to provide cybersecurity in smart manufacturing components, systems, design, integration, and operation and maintenance;
- propose possibilities for smart manufacturing specific profiling in order to simplify application of IEC 62443 (all parts).

This report is limited to cybersecurity related impacts of smart manufacturing. Other requirements for smart manufacturing systems such as safety and reliability are left to be addressed in future reports. However, cybersecurity needs to consider and address safety issues triggered by security attacks.

The initial use case analysis constitutes a bottom-up approach intended to gain a better understanding of the topic. The provided use cases are not necessarily exhaustive. A top-down approach for a generic smart manufacturing model is aimed for in the future.

INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION – SMART MANUFACTURING –

Part 3: Challenges for cybersecurity

1 Scope

This part of IEC 63283 identifies challenges which apply to the engineering of a smart manufacturing facility related to cybersecurity.

NOTE Cybersecurity challenges and how to deal with them can impose constraints on the engineering of the smart manufacturing system.

2 Normative references

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.

IEC 62443 (all parts), *Security for industrial automation and control systems*