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Automation systems and integration — Integration of advanced process control and optimization capabilities for manufacturing systems —

Part 3: Verification and validation

Systèmes d'automatisation et intégration — Intégration de contrôles de processus avancés et capacités d'optimisation des systèmes de fabrication —

Partie 3: Vérification et validation

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 5, *Interoperability, integration and architectures for enterprise systems and automation applications*.

A list of all parts in the ISO 15746 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

As a crucial part of the increasingly complex manufacturing systems, automation and control applications which are enabled by advanced process control and optimization (APC-O) methodology and solutions are implemented under the direction of production planning and scheduling. This task involves initially the specific use of APC-O that will eventually enable the integration of manufacturing operations management (MOM) with the automation and control of manufacturing process and equipment.

Automation solutions equipped with both software and hardware components are provided by different suppliers to accomplish APC-O functions. Due to the diversity of development environments and the variety of demand focus, the automation solutions from various suppliers tend to be isolated and relatively independent, which make it harder for the automation solutions to be integrated. Consequently, various automation solution components that the customers can have access to are filled with redundant and duplicated functions, resulting in a waste of resources and limited interoperability. This document offers an interoperability framework for advanced process control and optimization with the intention of maximizing both the integration and the interoperability of automation solutions.

It is not the intent of this document to suggest that there is only one way of implementing APC-O or to force users to abandon their current way of implementing APC-O.

The target users of this document include users and providers of advanced process control and optimization solutions, such as, project solution suppliers, automation systems integrators, production departments of companies, process engineers, independent software testing organizations, implementation and consulting service organizations of advanced process control and optimization software, and relevant government and academic organizations.

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Automation systems and integration — Integration of advanced process control and optimization capabilities for manufacturing systems —

Part 3: Verification and validation

1 Scope

This document defines the principle of verification and validation according to the activity models and workflow of an advanced process control and optimization (APC-O) system, analyses and defines the general process for verification and validation of APC-O systems, and specifies a set of indicators and checkpoints used for verification and validation.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
checkpoint
point where *verification* (3.6) and *validation* (3.5) activities needed to be performed throughout the APC-O lifecycle

3.2
indicator
measurement of an aspect of the system or component

Note 1 to entry: There are two types of indicators: *quantitative indicators* (3.3) and *judgement indicators* (3.4).

3.3
quantitative indicator
indicator (3.2) that is calculated using formulae

3.4
judgement indicator
indicator (3.2) that is evaluated using the evaluation method

3.5
validation
process of evaluating an APC-O system to determine whether it satisfies the stakeholders' requirements for that system

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