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Enterprise-Control System Integration – Part 4: Objects and Attributes for Manufacturing Operations Management Integration

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Enterprise-Control System Integration − Part 4: Objects and Attributes for Manufacturing Operations Management Integration

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This standard was approved by the ISA Standards and Practices Board on 16 April 2018.

Contents

Figures

Tables

FOREWORD

This is Part 4 of a series of standards that defines the interfaces between Level 3 manufacturing operations management activities.

The scope of this Part 4 standard is limited to defining the details of the interface content within manufacturing operations management. The scope of this Part 4 standard is limited to the definition of object models and attributes for the information defined in ISA-95 Part 3. The goal is to reduce the effort, cost, and errors associated with implementing these interfaces.

The standard may be used to reduce the effort associated with implementing new product offerings. The goal is to have enterprise systems and control systems that interoperate and easily integrate.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2. Therefore, the first three clauses present the scope of the standard, normative references, and definitions, in that order.

Clause 4 is informative. It describes the general information about the object information models for manufacturing operations management. It defines the general information model characteristics.

Clause 5 is normative. It defines the object information model, relationships, and attributes for resource relationship network model.

Clause 6 is normative. It defines the object information model, relationships, and attributes for work definition information and workflow specification information.

Clause 7 is normative. It defines the object information model, relationships, and attributes for work schedule information.

Clause 8 is normative. It defines the object information model, relationships, and attributes for work performance information.

Clause 9 is normative. It defines the object information model, relationships, and attributes for work capability information.

Clause 10 is normative. It defines the object information model, relationships, and attributes for work master capability information.

Clause 11 is normative. It defines the references for Work KPI information.

Clause 12 is normative. It defines the object information model, relationships, and attributes for work alert information.

Clause 13 is normative. It defines the object information model, relationships, and attributes for work calendar information.

Clause 14 is informative. It defines the how to exchange documents for the scheduling, execution and reporting of work.

Clause 15 is normative. It defines the object information model, relationships, and attributes for work record information.

Clause 16 is informative. It defines the inter-relationships between the object models and lists the objects defined in the standard as an aid to documenting conformance and compliance.

Clause 17 is normative. It defines completeness, conformance and compliance criteria associated with the objects and attributes.

Annex A is informative. It contains questions and answers on the use and reason for elements in the standard.

Annex B is informative. It provides details on related standards.

Annex C is informative. It illustrates how to represent a workflow specification in BPMN.

Annex D is informative. It illustrates how to represent a workflow specification in flowchart notation.

Annex E is informative. It illustrates examples of work calendars.

Annex F is informative. It illustrates an example of a work record implementation.

INTRODUCTION

This ISA-95 Part 4 standard further defines the object models and attributes involved in data exchange between activities of manufacturing operations management defined in the Part 3 standard. The models and terminology defined in ISA-95 Part 3 and this Part 4:

- emphasize good manufacturing operations management integration practices during the entire life cycle of the systems;
- can be used to improve existing integration capability of manufacturing operations management systems; and
- can be applied regardless of the degree of automation.

Specifically, ISA-95 Part 3 and Part 4 provide a standard terminology and a consistent set of concepts and models for integrating manufacturing operations management systems that will improve communications between all parties involved. Benefits produced will reduce a user's time to reach full production levels for new products because they:

- enable vendors to supply appropriate tools for implementing integration of manufacturing operations management systems;
- enable users to better identify their needs;
- reduce the cost of automating manufacturing processes;
- optimize supply chains; and
- reduce life-cycle engineering efforts.

ISA-95 Part 3 and Part 4 may be used to reduce the effort associated with implementing new product offerings. The goal is to have manufacturing operations management systems that interoperate and easily integrate.

It is not the intent of the standards to:

- suggest that there is only one way of implementing integration of manufacturing operations management systems;
- force users to abandon their current way of handling integration; or
- restrict development in the area of integration of manufacturing operations management systems.

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1 Scope

This ISA-95 Part 4 standard defines object models and attributes exchanged between Level 3 manufacturing operations management activities defined in ISA-95 Part 3.

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.

ANSI/ISA-95.00.01-2010, *Enterprise-control system integration – Part 1: Models and terminology* (referred to hereafter in the standard as ISA-95 Part 1 or simply “Part 1”)

ANSI/ISA-95.00.02-2010, *Enterprise-control system integration – Part 2: Objects and attributes for enterprise-control system integration* (referred to hereafter in the standard as ISA-95 Part 2 or simply “Part 2”)

ANSI/ISA-95.00.03, *Enterprise-control system integration – Part 3: Activity models of manufacturing operations management* (referred to hereafter in the standard as ISA-95 Part 3 or simply “Part 3”)

IEC 61512-1, *Batch control – Part 1: Models and terminology*

IEC 61512-4:2009, *Batch control – Part 4: Batch production records*

ISO/IEC 19501, *Information technology – Open Distributed Processing – Unified Modeling Language (UML) Version 1.4.2*

ISO/IEC 19505-1, *Information technology – Object Management Group Unified Modeling Language (OMG UML) – Part 1: Infrastructure*

ISO/IEC 19505-2, *Information technology – Object Management Group Unified Modeling Language (OMG UML) – Part 2: Superstructure*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*

ISO 22400-1, *Automation systems and integration – Key performance indicators (KPIs) for manufacturing operations management – Part 1: Overview, concepts and terminology*

ISO 22400-2, *Automation systems and integration – Key performance indicators (KPIs) for manufacturing operations management – Part 2: Definitions and descriptions*

IEC 62682, *Management of Alarm Systems for the Process Industries*

3 Terms, definitions, abbreviations, and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISA-95 Part 1 (see Clause 2 above) apply, as do the following:

3.1.1
batch production record (BPR)
subset of the execution and business information that is retained based upon business requirements identified by the batch production record specification