



BSI Standards Publication

Industrial automation systems and integration — Industrial manufacturing management data: Resources usage management

Part 32: Conceptual model for resources usage management data

National foreword

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*Systèmes d'automatisation industrielle et intégration — Données de
gestion de fabrication: Gestion d'emploi des ressources —*

*Partie 32: Modèle conceptuel pour les données de gestion d'emploi
des ressources*



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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.

International Standards are drafted in accordance with the rules given in the ISO/ IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

[ISO 15531-32](#) was prepared by Technical Committee ISO TC184/SC4, *Industrial automation systems and integration*, Subcommittee SC4 *Industrial data*.

A complete list of parts of [ISO 15531](#) is available from the Internet.

<http://www.tc184-sc4.org/titles/>

Introduction

Manufacturing resources form the basis and long-term potential of any company. The efficient use of these resources is one of the main goals in industrial management. Comprehensive information about available manufacturing resources is required in order to take the necessary decisions for efficient resource usage. Since many different enterprise functions and therefore also different IT-systems are dealing with manufacturing resources. A common, standardized model for resource description is necessary. That standardised model should enable a company to communicate internally and externally about manufacturing resources and furthermore enable to build up an industrial company's resource database. Its basis will be the definition of an information model for the description of manufacturing resources.

A complete description of manufacturing resources is out of scope of this information model. Only data relevant for decisions concerning the usage of manufacturing resources (e.g. within process planning or job scheduling) will be considered. Therefore only data describing manufacturing resources in terms of their static and dynamic capabilities and capacities to perform manufacturing tasks are within the scope of this information model for resource usage management. There mainly exist two different types of capabilities. On the one hand, there exist capabilities describing a manufacturing resource which are dedicated and unique characteristics in the context of resource management. On the other hand, there exist capabilities which are used within resource management but represent a specific view on characteristics belonging originally to the product description of a manufacturing resource.

EXAMPLE some geometrical or shape properties may belong to the product description and may be needed for the management of concerned resource.

Therefore there is a strong link to the product defining data of manufacturing resources, e.g. described by using the [ISO 10303](#) standard.

On the other hand, the data residing in this information model for manufacturing resource management will mainly be used within process planning. This planning will result in the assignment of manufacturing resources and the required technological parameters for resource utilisation and these results will be documented by means of ISO 10303-240. On the other hand the data describing capability and capacity of manufacturing resources will be used together with process plans as input for scheduling tasks which will be conceptually defined in ISO 15531-4x series.

This part of [ISO 15531](#) specifies a model of manufacturing resources that is written in EXPRESS and makes the fullest possible use of the "Integrated Resources" in [ISO 10303](#). The model may therefore be used by other SC4 standards.

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Industrial automation systems and integration — Industrial manufacturing management data: Resources usage management —

Part 32: Conceptual model for resources usage management data

1 Scope

This part of [ISO 15531](#) specifies the full description of the conceptual model for resources usage management data, based on the resource information model and basic principles described in [ISO 15531-31](#).

The following are within the scope of this part 32 of [ISO 15531](#):

- The description of the conceptual resource information model and related definitions for resource usage management data;
- The EXPRESS description of the model and related entities;
- The EXPRESS-G diagram of the model.

2 Normative references

The following referenced documents are indispensable for the application 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.

[ISO/IEC 8824-1](#), *Information Technology — Abstract Syntax Notation One (ASN.1): Specification of Basic Notation*.

[ISO 10303-1](#), *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and Fundamental Principles*.

[ISO 10303-11:1994](#), *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*.

[ISO 10303-41](#), *Industrial automation systems and integration — Product data representation and exchange — Part 41: Integrated generic resources: Fundamentals of product description and support*.

[ISO 10303-49](#), *Industrial automation systems and integration — Product data representation and exchange — Part 49: Integrated generic resources: Process structure and properties*.

ISO 10303-214, *Industrial automation systems and integration — Product data representation and exchange — Part 214: Application Protocol: Core data for automotive mechanical design processes*.

ISO 10303-224, *Industrial automation systems and integration — Product data representation and exchange — Part 224: Application Protocol: Mechanical product definition for process planning using machining features*.

ISO 13584-1, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles*.

[ISO 13584-42](#), *Industrial automation systems and integration — Parts library — Part 42: Description methodology: Methodology for structuring parts families.*

[ISO 15531-1](#), *Industrial automation systems and integration — Industrial manufacturing management data - Part 1: General overview.*

[ISO 15531-31](#), *Industrial automation systems and integration — Industrial manufacturing management data — Part 31: Resource information model.*

[ISO 15531-42](#), *Industrial automation systems and integration — Industrial manufacturing management data — Part 42: time model*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

attribute

a piece of information stating a property of an enterprise entity

Note 1 to entry: The concept provided here relates to the broad concept of entity as defined in European standard ENV 12204? The term entity used in the definition provided by the ENV 12204 has been replaced here by enterprise entity as in [ISO 15531-1](#) to avoid any confusion and inconsistency with the reserved term "entity" defined in [ISO 10303-11](#). The usage of this concept has been limited to the area of concern of [ISO 15531](#) in order to enable the use of the term "enterprise entity" instead of "entity and the field of application of the term attribute is restricted to enterprise entities.

[SOURCE: ISO 15531-31]

3.1.2

capability

quality of being able to perform a given activity

Note 1 to entry: The capability is defined by a group of characteristics that describes functional aspects of manufacturing resources or system.

[SOURCE: ISO 15531-1]

3.1.3

capacity

capability of a system, sub-system or resource to perform its expected function from a quantitative point of view

EXAMPLE The capacity of a system or a resource to produce a given quantity of output in a particular time period.

Note 1 to entry: For a given system or resource the distinction between capacity available and capacity requested may be useful.

[SOURCE: ISO 15531-1]

3.1.4

classification

the process of arranging abstractions into a structure organised according to their distinguishing properties

[SOURCE: ISO 15531-31]

3.1.5

component

a product that is not subject to decomposition from the perspective of a specific application

[SOURCE: ISO 10303-1]

3.1.6

data

a representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[SOURCE: ISO 10303-1]

3.1.7

definition of resource characteristics

set of resources properties that are characterised by physical values

Note 1 to entry: Those physical values may be qualitative or quantitative.

[SOURCE: ISO 15531-31]

3.1.8

definition of resource views

classified set of resource views

Note 1 to entry: Those resource view may be defined either by the user or catalogues.

[SOURCE: ISO 15531-31]

3.1.9

generic resource

structure belonging to resource hierarchy and encompassing the common properties of several resources

Note 1 to entry: The corresponding entity generic_resource includes a complete definition of the related attribute without link to actual value.

[SOURCE: ISO 15531-31]

3.1.10

information

facts, concepts, or instructions

[SOURCE: ISO 10303-1]

3.1.11

interpretation

the process of adapting a resource construct from the integrated resources to satisfy a requirement of an application protocol. This may involve the addition of restrictions on attributes, the addition of constraints, the addition of relationships among resource constructs and application constructs, or all of the above

[SOURCE: ISO 10303-1]

3.1.12

information model

a formal model of a bounded set of facts, concepts or instructions to meet a specified requirement

[SOURCE: ISO 10303-1]

3.1.13

integrated resource

a part of this International Standard that defines a group of resource constructs used as the basis for product data

[SOURCE: ISO 10303-1]

3.1.14

model

representation or description of an entity or a system, describing only the aspects considered to be relevant for its purpose

Note 1 to entry: Entity is not used here with the meaning provided by [ISO 10303-11](#) but with the sense usually given in ENV 12204

[SOURCE: ISO 15531-1]

3.1.15

object

concept or a physical thing which may exist in the real world

[SOURCE: ISO 15531-31]

3.1.16

process

structured set of activities involving various enterprise entities, that is designed and organised for a given purpose

Note 1 to entry: The definition provided here is very close to that given in [ISO 10303-49](#). Nevertheless [ISO 15531](#) needs the notion of structured set of activities, without any predefined reference to the time or steps. In addition, from the point of view of flow management, some empty processes may be needed for a synchronisation purpose although they are not actually doing anything (ghost task).

[SOURCE: ISO 15531-1]

3.1.17

product

a thing or substance produced by a natural or artificial process

[SOURCE: ISO 10303-1]

3.1.18

product data

a representation of information about a product in a formal manner suitable for communication, interpretation, or processing by human beings or by computers

[SOURCE: ISO 10303-1]

3.1.19

property

a real world characteristic which is represented by either attributes or constraints

[SOURCE: ISO 15531-31]