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## Industrial automation systems and integration — Product data representation and exchange —

### Part 1: Overview and fundamental principles

*Systèmes d'automatisation industrielle et intégration — Représentation et échange de données de produits —*

*Partie 1: Aperçu et principes fondamentaux*

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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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*.

This second edition cancels and replaces the first edition (ISO 10303-1:1994), which has been technically revised.

The main changes compared to the previous edition are as follows:

- inclusion of application interpreted constructs;
- inclusion of application modules;
- inclusion of business object models;
- inclusion of additional implementation methods;
- inclusion of modular architecture as a preferred alternative to the initial architect of ISO 10303-1:1994;
- permission for integrated resources to reference constructs written using EXPRESS from other International Standards;
- corrections to part numbering scheme;
- extension of information object registration to be usable on other standards;
- inclusion of usage guides;
- additional definitions.

ISO 10303 is organized as a series of parts, each published separately. The structure of ISO 10303 is described in this part of ISO 10303.

Each part of ISO 10303 is a member of one of the following series: description methods, implementation methods, conformance testing methodology and framework, integrated generic resources, integrated

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application resources, application protocols, abstract test suites, application interpreted constructs (See [3.1.9](#)), application modules and business object models.

A list of all parts in the ISO 10303 is available from the following URL:

[http://standards.iso.org/iso/10303/tech/step\\_titles.htm](http://standards.iso.org/iso/10303/tech/step_titles.htm).

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](http://www.iso.org/members.html).

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## Introduction

ISO 10303 is an International Standard for the computer-interpretable representation of product information and for the exchange of product data. The objective is to provide a neutral mechanism capable of describing products throughout their life cycle. This mechanism is suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases, and as a basis for archiving. The information generated about a product during its design, manufacture, use, maintenance, and disposal is used for many purposes. The use may involve many computer systems, including some that may be located in different organizations. In order to support such uses, organizations need to be able to represent their product information in a common computer-interpretable form that is required to remain complete and consistent when exchanged among different computer systems.

This part of ISO 10303 is an overview of ISO 10303. It specifies the overall scope of ISO 10303 and describes the ISO 10303 architectures and structure. It describes the various series of parts of ISO 10303 and the relationships among them.

NOTE The ISO/TC 184/SC 4 Handbook<sup>[1]</sup> has been created to describe the SC 4 specific requirements for the execution of the committees work and to meet the requirements of the ISO/IEC Directives. It sets out the procedures to be followed within SC 4 in carrying out its technical work of the development and maintenance of International Standards through the activities of its Leadership, Teams and Working Groups.

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# Industrial automation systems and integration — Product data representation and exchange —

## Part 1: Overview and fundamental principles

### 1 Scope

This part of ISO 10303 provides an overview of ISO 10303.

ISO 10303 provides a representation of product information along with the necessary mechanisms and definitions to enable product data to be exchanged. The exchange is among different computer systems and environments associated with the complete product lifecycle, including product design, manufacture, use, maintenance, and final disposition of the product.

This part of ISO 10303 defines the basic principles of product information representation and exchange used in ISO 10303. It specifies the characteristics of the various series of parts of ISO 10303 and the relationships among them.

The following are within the scope of this part of ISO 10303:

- scope statement for ISO 10303 as a whole;
- overview of ISO 10303;
- architecture of ISO 10303;
- structure of ISO 10303;
- terms and definitions used throughout ISO 10303;
- overview of data specification methods used in ISO 10303;

NOTE This includes the EXPRESS data specification language and graphical presentation of product information models (See [3.1.50](#)).

- introduction to the series of parts of ISO 10303:
  - integrated resources;
  - application interpreted constructs;
  - application modules;
  - business object models;
  - application protocols;
  - implementation methods;
  - usage guides;
  - conformance testing methodology and framework;

- abstract test suites;
- scheme for identification of schemas and other information objects defined within parts of ISO 10303.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

### 3.1 Terms and definitions

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

#### 3.1.1

##### **abstract test case**

ATC

specification, encapsulating at least one test purpose, that provides the formal basis from which executable test cases are derived and that is independent of both the implementation and the values

#### 3.1.2

##### **abstract test method**

ATM

description of how an implementation is to be tested, given at the appropriate level of abstraction to make the description independent of any specific implementation of testing tools or procedures, but with sufficient detail to enable these tools and procedures to be produced

#### 3.1.3

##### **abstract test suite**

ATS

part of ISO 10303 that contains the set of abstract test cases necessary for conformance testing of an implementation of an application protocol

#### 3.1.4

##### **agreement of common understanding**

result of discussions between the partners of product data exchange or sharing, that ensures that all of them have the same understanding of the transferred or shared information

#### 3.1.5

##### **application**

one or more processes creating or using product data

#### 3.1.6

##### **application activity model**

AAM

model that describes an application in terms of its processes and information flows

#### 3.1.7

##### **application construct**

collection of EXPRESS language entities, types, functions, rules and references that are based on resource constructs and that specialize those resource constructs as necessary to define a valid description of an aspect of product data for specific application areas

#### 3.1.8

##### **application context**

subset of an application activity model

**3.1.9****application interpreted construct**

AIC

logical grouping of interpreted constructs that supports a specific function for the usage of product data across multiple application contexts. See [3.1.41](#) for definition of interpretation

**3.1.10****application interpreted model**

AIM

information model that includes the application constructs necessary to satisfy the requirements of an application reference model

**3.1.11****application module**

AM

reusable collection of a scope statement, information requirements, mappings and module interpreted model that supports a specific usage of product data across multiple application contexts

**3.1.12****application object**

AO

atomic element of an application reference model that defines a unique concept of the application and contains attributes specifying the data elements of the object

**3.1.13****application programming interface**

API

A set of standard software interrupts, calls, functions, and data formats that can be used by an application program to access network services, devices, or operating systems.

**3.1.14****application programming interface implementation**

API implementation

An implementation of this standard that supplies the services of the application programming interface, in contrast to an implementation of this standard that uses the application programming.

**3.1.15****application programming interface instance**

API instance

An individual execution context and state of an application programming interface implementation.

Note 1 to entry: The notion of “execution context” in this standard is the same as in ECMAScript.

**3.1.16****application programming interface signature**

APIS

description of the set of functions, protocols, and tools that programmers can use to enhance applications to access network services, devices, or operating systems.

**3.1.17****application protocol**

AP

part of ISO 10303 that specifies an application interpreted model satisfying the scope and information requirements for a specific application

Note 1 to entry: This definition differs from the definition used in ISO 7498-2:1989 Information processing systems — Open Systems Interconnection<sup>[2]</sup> standards because the protocols address different contexts of use.