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

Part 46:

Integrated generic resources: Visual presentation

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

Partie 46: Ressources génériques intégrées: Présentation visuelle

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Foreword

The International Organization for Standardization (ISO) 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.

Draft International Standards adopted by 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.

International Standard ISO 10303–46 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration,* Subcommittee SC4, *Industrial data and global manufacturing programming languages.*

ISO 10303 consists of the following parts under the general title *Industrial automation systems and integration – Product data representation and exchange:*

- Part 1, Overview and fundamental principles;
- Part 11, Description methods: The *EXPRESS* language reference manual;

- Part 21, Implementation methods: Clear text encoding of the exchange structure;
- Part 22, Implementation methods: Standard data access interface specification;
- Part 31, Conformance testing methodology and framework: General concepts;
- Part 32, Conformance testing methodology and framework: Requirements on testing laboratories and clients;
- Part 41, Integrated generic resources: Fundamentals of product description and support;
- Part 42, Integrated generic resources: Geometric and topological representation;
- Part 43, Integrated generic resources: Representation structures;
- Part 44, Integrated generic resources: Product structure configuration;
- Part 45, Integrated generic resources: Materials;
- Part 46, Integrated generic resources: Visual presentation;
- Part 47, Integrated generic resources: Shape variation tolerances;
- Part 49, Integrated generic resources: Process structure and properties;

- Part 101, Integrated application resources: Draughting;
- Part 104, Integrated application resources: Finite element analysis;
- Part 105, Integrated application resources: Kinematics;
- Part 201, Application protocol: Explicit draughting;
- Part 202, Application protocol: Associative draughting;
- Part 203, Application protocol: Configuration controlled design;
- Part 207, Application protocol: Sheet metal die planning and design;
- Part 210, Application protocol: Printed circuit assembly product design data;
- Part 213, Application protocol: Numerical control process plans for machined parts.

The structure of this International Standard is described in ISO 10303-1. The numbering of the parts of this International Standard reflects its structure:

- Part 11 specifies the description methods;
- Parts 21 and 22 specify the implementation methods;

- Parts 31 and 32 specify the conformance testing methodology and framework;
- Parts 41 to 49 specify the integrated generic resources;
- Parts 101 to 105 specify the integrated application resources;
- Parts 201 to 213 specify the application protocols.

Should further parts be published, they will follow the same numbering pattern.

Annexes A and B form an integral part of this part of ISO 10303. Annexes C, D, E and F are for information only.

Diskette

Users should note that this part of ISO 10303 comprises a diskette:
— the short names of entities given in annex A are also included on the diskette;
— the EXPRESS listings (annex C) are provided on the diskette only;
— a method to enable users to report errors in the documentation is given. Full details are provided in the file.

Introduction

ISO 10303 is an International Standard for the computer-interpretable representation and exchange of product data. The objective is to provide a neutral mechanism capable of describing product data throughout the life cycle of a product independent from any particular system. The nature of this description makes it suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases and archiving.

This International Standard is organized as a series of parts, each published separately. The parts of ISO 10303 fall into one of the following series: description methods, integrated resources, application protocols, abstract test suites, implementation methods, and conformance testing. The series are described in ISO 10303–1. This part of ISO 10303 is a member of the integrated resources series. Major subdivisions of this International Standard are:

- Presentation organization
- Presentation definition
- Presentation appearance
- Presentation resources

This part of ISO 10303 specifies the integrated resources for the visualization of displayable properties of products.

The information given in all four schemas of this part together is sufficient to describe in detail how product information shall be visualized by a receiving system. The presentation information contained in this part can be used only in conjunction with product information suitable for display. Presentation information as contained in this part cannot be displayed by itself without reference to product information.

The presentation organization schema describes the hierarchical and partially recursive structure of the presentation sets, areas and views in which images of the product information are displayed. It also explains how the components of the product information image and its annotation are organized as displayable objects and how these are placed into the context of presentations. This schema also accounts for the definition of the projective process for geometry by means of a camera model and for the specification of lighting and shading models.

The presentation definition schema serves to define how the individual geometric and non–geometric components of the product information are selected, assembled into presentation groups, and associated with presentation styles.

The presentation appearance schema defines the appearance attributes that can be chosen to describe the desired visual appearance of the displayable elements of the product information by enumerating the available graphical presentation styles.

The presentation resource schema provides basic graphical capabilities such as text font definition, symbol definition, and colour definition.

The visual presentation characteristics described in this part are often associated with information from other generic resource parts, especially with geometric and topological representations

(ISO 10303-42). The Application Protocols determine which resource parts are used together. Applications which make use of the generic resources in this part provide both the product information to be visually presented and the semantic meaning of the presentation. Possible applications include rendered views of product shape, results of scientific visualization, technical drawings, diagrams, charts, and graphics for technical publications.

Relation to graphics standards

The integrated resources specified in this part of ISO 10303 support the visual presentation of the properties of products. The generation of visual images using data specified by these integrated resources requires the use of an appropriate display system. This part of ISO 10303 specifies the input data to such systems, together with the necessary structures and constraints that relate presentation data to other aspects of product data.

Many display systems conform to existing ISO standards for computer graphics, such as GKS-3D (ISO/IEC 8805) and PHIGS/PHIGS PLUS (ISO/IEC 9592). This part of ISO 10303 takes into account the concepts and terminology of these standards. Input data specified by this part of ISO 10303 is therefore intended to be suitable for further processing by displays conforming to graphics standards.