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

Part 232:

**Application protocol: Technical data  
packaging core information and exchange**

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

*Partie 232: Protocole d'application: Information centrale et échange de  
paquetage de données techniques*

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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 3.

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 part of ISO 10303 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10303-232 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

This International Standard is organized as a series of parts, each published separately. The structure of this standard is described in ISO 10303-1.

Each part of this International Standard is a member of one of the following series: description methods, implementation methods, conformance testing methodology and framework, integrated generic resources, integrated application resources, application protocols, abstract test suites, application interpreted constructs, and application modules. This part is a member of the application protocols series.

A complete list of parts of ISO 10303 is available from the Internet:

<<http://www.nist.gov/sc4/editing/step/titles/>>

Should further parts of ISO 10303 be published, they will follow the same numbering pattern.

Annexes A, B, C, D and E form a normative part of this part of ISO 10303. Annexes F, G, H, J and K are for information only.

## 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 lifecycle. 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.

This part of ISO 10303 is a member of the application protocol series. This part of ISO 10303 specifies an application protocol (AP) for packaging product data so that configuration controlled access and data exchanges can be achieved among Product Data Management (PDM) systems.

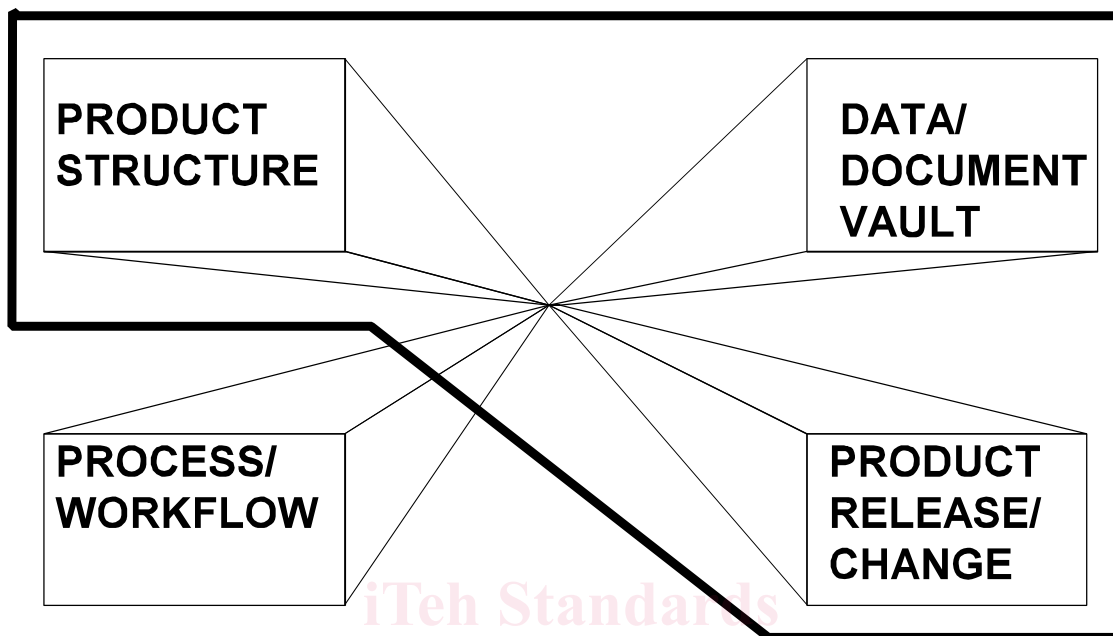
This part of ISO 10303 identifies specific groupings of product information for the access or exchange of data, such as part lists and drawings. An integrated packing list of these product information groups can be captured by this part of ISO 10303 which satisfies data accountability requirements during data access or a data exchange. The actual format of the data being accessed or exchanged may be through ISO 10303 applications protocols (including this part of ISO 10303), through other ISO standards that define computer file formats, or any other computer file format that is agreed to by parties involved in the data access or data exchange agreement. This capability will satisfy the industrial need to communicate and share the total design definition of a product from an overall product data configuration structure perspective among organizations, partners, vendors, and customers. Portions of product data can be exchanged with the knowledge of where that portion belongs in the overall product data configuration structure. The goal of this part of ISO 10303 is to provide an information structure wherein product information can be electronically captured and managed from both a product information item perspective and a document based perspective, such as in PDM systems.

Current PDM systems being installed in industry manage documents from a product view point. No ISO 10303 Application Protocol addresses a document configuration for product data structures. This part of ISO 10303 addresses this document configuration structure void. Enterprises and industries that have large infrastructures that rely on document based management systems will utilize this part of ISO 10303 to migrate from their current implementations into a configuration control of product data from a product item perspective.

There are two aspects to this part of ISO 10303. The first is the packaging of product data for exchange or access. The second is to provide the exchange requirements of individual product data groupings focusing on associated list information such as data list, index list, indented data list, and parts list.

The packaging aspect provides the requirements for collecting, organizing, and managing the exchange of a complex set of data files or database views representing the different product data groupings that identify and define a product. These packaging aspects reside in a PDM's underlying metadata. A product data grouping defines a particular view of product information and may be identified and managed as a document, or a product data set or a unique view within a database. Drawings, Associated Lists, and Reference Documents are considered product data groupings. The practice of packaging product data into groupings is called an Engineering Data Package or a Technical Data Package (TDP). As a result of this packaging, this part of ISO 10303 defines the interoperation of other parts of ISO 10303 (for example, ISO 10303-203 and ISO 10303-202) and the managed inclusion of a mixed set of standards for representation of the various TDP elements, such as simple product data groupings.

Figure 1 is the high level functions of a PDM system. The areas enclosed in Figure 1 identify the information this part of ISO 10303 will support.

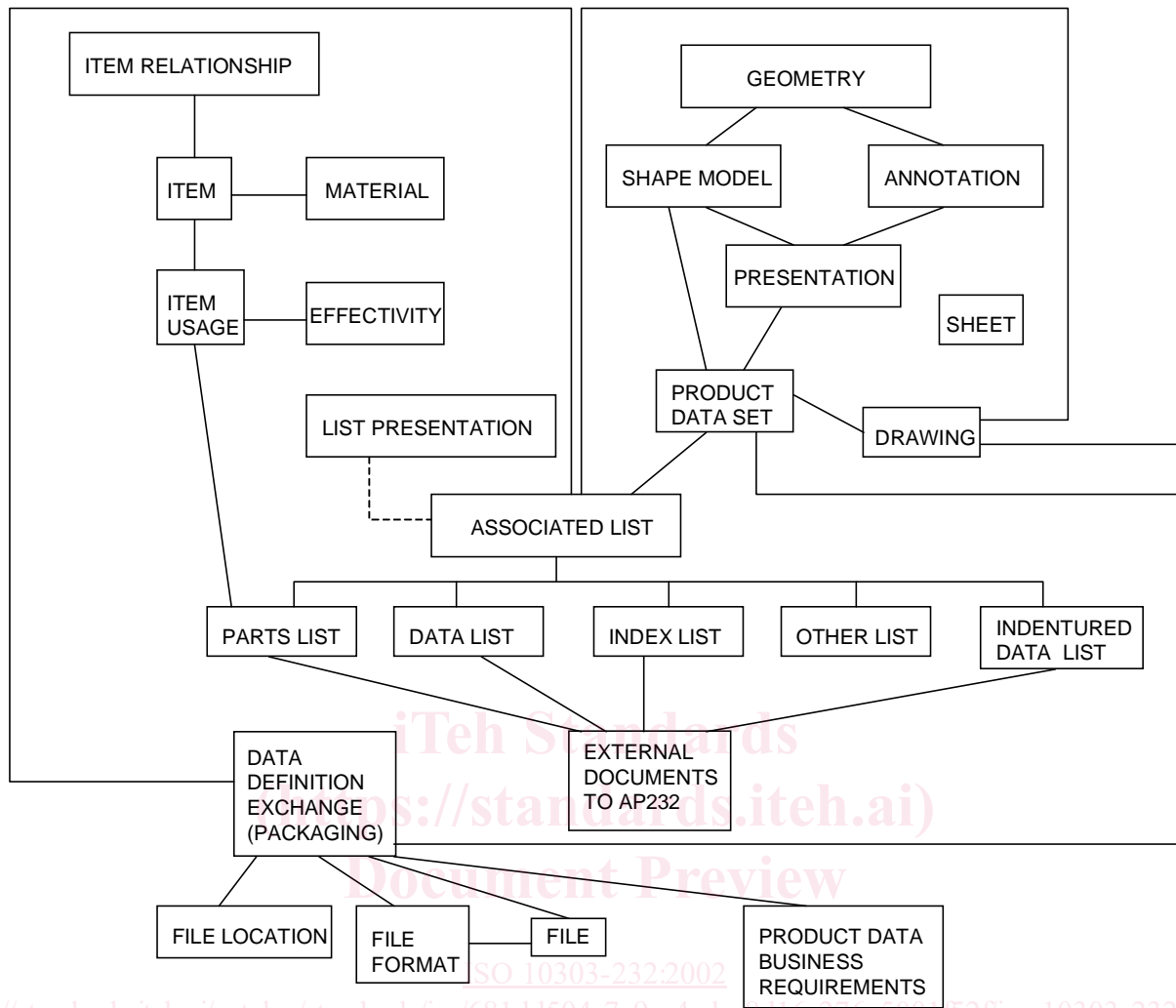


**Figure 1 — PDM information area ISO 10303-232 addresses**

Figure 2 is a high level planning model that describes some of the basic information concepts and their relationships contained in this part of ISO 10303. These concepts and relationships include the following:

- identification of a product and the relationship of that product to its constituents;
- identification of the TDP elements and the relationship of those TDP elements to each other;
- identification of the relationship between a product and its TDP element or the relationship among products and their TDP elements;
- the documentation of formal change level and release status of product information and the TDP elements for the product information;
- the definition and presentation of associated list information;
- the packaging of the TDP elements for access or exchange.

NOTE 1 Annex K provides comprehensive descriptions for many of the capabilities this part of ISO 10303 provides.



**Figure 2 — High level planning model**

This application protocol defines the context, scope, and information requirements for the content and exchange of technical data packages and specifies the integrated resources necessary to satisfy these requirements.

NOTE 2 Technical data packages may define products, component parts, assemblies, and their related documentation. TDPs are not confined to mechanical definitions of a product, but may define TDPs that define functionality of a product, TDPs that define concepts for a product, or TDPs that define form and fit of a product.

NOTE 3 This part of ISO 10303 may define interoperation of other ISO 10303 APs within a TDP.

NOTE 4 This part of ISO 10303 may identify the co-existence of ISO 10303 APs with different data representations for the same product information.

NOTE 5 This part of ISO 10303 may identify product data stored in other computer data file formats and the relationship of the data contained in the file with other product data contained in other computer data files.

Application protocols provide the basis for developing implementations of ISO 10303 and abstract test suites for the conformance testing of AP implementations.

Clause 1 defines the scope of the application protocol and summarizes the functionality and data covered by the AP. Clause 3 lists the words defined in this part of ISO 10303 and gives pointers to words defined elsewhere. An application activity model that is the basis for the definition of the scope is provided in annex F. The information requirements of the application are specified in clause 4 using terminology appropriate to the application. A graphical representation of the information requirements, referred to as the application reference model, is given in annex G.

Resource constructs are interpreted to meet the information requirements. This interpretation produces the application interpreted model (AIM). This interpretation, given in 5.1, shows the correspondence between the information requirements and the AIM. The short listing of the AIM specifies the interface to the integrated resources and is given in 5.2. Note that the definitions and EXPRESS provided in the integrated resources for constructs used in the AIM may include select list items and subtypes which are not imported into the AIM. The expanded listing given in annex A contains the complete EXPRESS for the AIM without annotation. A graphical representation of the AIM is given in annex H. Additional requirements for specific implementation methods are given in annex C.

NOTE 6 ISO 10303 standards are referenced throughout the documentation of the requirements of this part of ISO 10303. This part utilizes ISO 10303 standards through the use of application interpreted constructs.

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