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

Part 219:

**Application protocol: Dimensional
inspection information exchange**

iTeh STANDARD PREVIEW

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

*Partie 219: Protocole d'application: Échange d'information par
vérification dimensionnelle*

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Published in Switzerland

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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 10303-219 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

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

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 application resources, application protocols, abstract test suites, application interpreted constructs, and application modules. This part of ISO 10303 is a member of the application protocol series.

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

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

Introduction

ISO 10303 is an International Standard for the computer-interpretable representation production information 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 part of ISO 10303 is a member of the application protocol series. This part of ISO 10303 specifies an application protocol (AP) for the exchange of information resulting from the dimensional inspection of solid parts. Industry is faced with numerous proprietary inspection languages and interfaces. This causes overhead problems associated with maintaining multiple systems or locks users to one vendor. In particular, there are no adequate standard systems for linking coordinate measurement machines and other types of automated inspection systems with systems that analyze and track dimensional inspection results. During the course of four workshops held on dimensional inspection information exchange, industry representatives indicated that a standard or a specification for dimensional inspection information exchange is critical to their future operations. The focus of the proposed standard is the analysis and reporting activity for dimensional inspection. The measurement process itself is not within the scope of this part of ISO 10303. The primary benefit will be a link between dimensional inspection programs, provided by ISO 22093 (DMIS 4.0), Web-based analysis and reporting practices, aimed for in the Metrology Interoperability Project (MIP), and standard information models for manufacturing provided for example, by ISO 10303-224 and ISO 10303-238. The information provided by the DMIS and the MIP will be mappable into entities of this part of ISO 10303 and transportable into other ISO 10303 based implementations.

In addition this part of ISO 10303 captures the digital representation of dimensioning and tolerancing information requirements in standards ISO 1101 and ISO 5459 developed by ISO TC 213 on Geometrical Product Specifications and Verification.

This application protocol defines the context, scope, and information requirements for analyzing and reporting the information and results of dimensional inspection and specifies the integrated resources necessary to satisfy these requirements.

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.

Figure 1 contains the data planning model that provides a high level description of the requirements for this application protocol. This planning model was created from the in-scope data from the activities of the application activity model (AAM) and grouped into logical units of functionality. This planning model is used as a guide in developing the application reference model (ARM).

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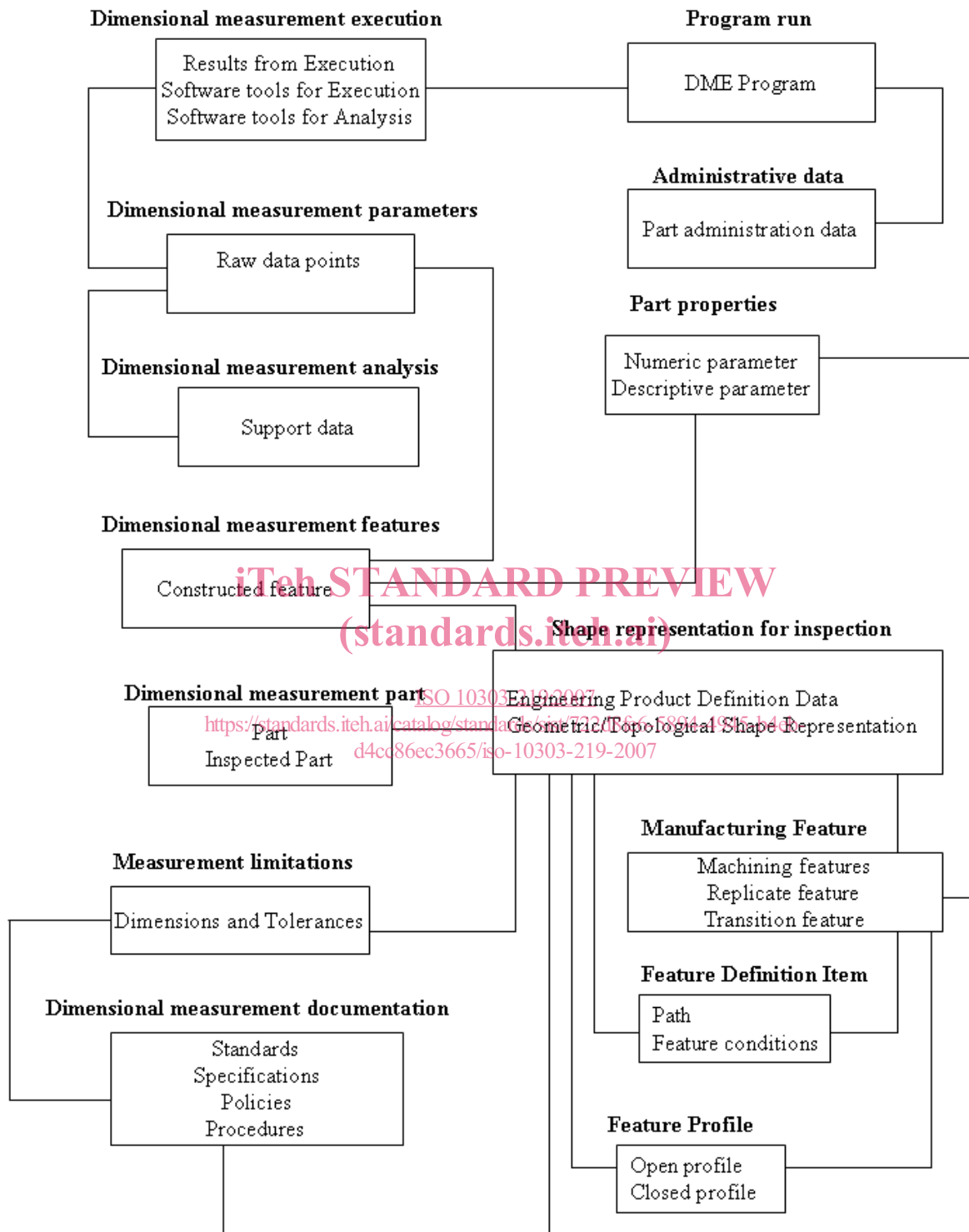


Figure 1 — Data planning model

Industrial automation systems and integration — Product data representation and exchange — Part 219: Application protocol: Dimensional inspection information exchange

1 Scope

This part of ISO 10303 specifies the use of the integrated resources necessary for the scope and information requirements for analyzing the data and reporting the results of dimensional inspections of solid parts or assemblies. Dimensional inspection can occur at any stage of the life cycle of a product where checking for conformance with a design specification is required.

NOTE The application activity model, in Annex F, provides a graphical representation of the processes and information flows which are the basis for the definition of the scope of this part of ISO 10303.

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

- data for administering, planning; [standards.iteh.ai](https://standards.iteh.ai/catalog/standards/sist/722d8fe6-5894-4945-b4eb-219-2007)
- data for executing dimensional inspection; [ISO 10303-219:2007](https://standards.iteh.ai/catalog/standards/sist/722d8fe6-5894-4945-b4eb-219-2007)
- data for archiving the results of a dimensional inspection; [ISO 10303-219:2007](https://standards.iteh.ai/catalog/standards/sist/722d8fe6-5894-4945-b4eb-219-2007)
- interface for capturing technical data out of the upstream application protocols;
- machining feature classification structure;
- geometric and dimensional tolerances of the parts being manufactured;
- references to standards and specifications declared in the dimensional inspection.

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

- dimensional inspection of liquid surfaces;
- materials properties of parts;
- manufacturing activities;
- mathematical algorithms to perform the dimensional inspection analysis;
- developing or modifying manufacturing process information;
- generating geometry (creating the CAD model);

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- generating tolerance requirements;
- inspection of material properties.

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 286-1, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits.*

ISO 286-2, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

ISO 1101, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out.*

ISO 5459, *Geometrical product specifications (GPS) — Geometrical tolerancing — Datums and datum-systems.*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 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 10303-11:2004, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual.*

ISO 10303-21, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure.*

ISO 10303-41, *Industrial automation systems and integration — Product data representation and exchange — Part 41: Integrated generic resource: Fundamentals of product description and support.*

ISO 10303-42, *Industrial automation systems and integration — Product data representation and exchange — Part 42: Integrated generic resource: Geometric and topological representation.*

ISO 10303-43, *Industrial automation systems and integration — Product data representation and exchange — Part 43: Integrated generic resource: Representation structures.*

ISO 10303-45, *Industrial automation systems and integration — Product data representation and exchange — Part 45: Integrated generic resource: Materials.*

ISO 10303-47, *Industrial automation systems and integration — Product data representation and exchange — Part 47: Integrated generic resource: Shape variation tolerances.*

ISO 10303-49, *Industrial automation systems and integration — Product data representation and exchange — Part 49: Integrated generic resource: Process structure and properties.*

ISO 10303-224:2006, *Industrial automation systems and integration — Product data representation and exchange — Part 224: Application protocol: Mechanical product definition for process planning using machining features.*

ISO 10303-238, *Industrial automation systems and integration — Product data representation and exchange — Part 238: Application protocol: Application interpreted model for computerized numerical controllers.*

ISO 10303-240, *Industrial automation systems and integration — Product data representation and exchange — Part 240: Application protocol: Process plans for machined products.*

ISO 10303-514, *Industrial automation systems and integration — Product data representation and exchange — Part 514: Application interpreted construct: Advanced boundary representation.*

ISO 10303-519, *Industrial automation systems and integration — Product data representation and exchange — Part 519: Application interpreted construct: Geometric tolerances.*

ISO 10303-522, *Industrial automation systems and integration — Product data representation and exchange — Part 522: Application interpreted construct: Machining features.*

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3 Terms, definitions and abbreviations

3.1 Terms defined in ISO 1101 ISO 10303-219:2007 <https://standards.iteh.ai/catalog/standards/sist/722d8fe6-5894-4945-b4eb-d4cc86ec3665/iso-10303-219-2007>

For the purposes of this document, the following terms defined in ISO 1101 apply.

- dimension;
- tolerance.

3.2 Terms defined in ISO 5459

For the purposes of this document, the following terms defined in ISO 5459 apply.

- datum.

3.3 Terms defined in ISO 10303-1

For the purposes of this document, the following terms defined in ISO 10303-1 apply.

- application;
- application activity model (AAM);
- application interpreted model (AIM);