INTERNATIONAL STANDARD

ISO 23584-1

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Optics and photonics — Specification of reference dictionary —

Part 1: General overview on organization and structure

Optique et photonique — Spécification d'un dictionnaire de référence — Partie 1: Aperçu général sur l'organisation et la structure

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Contents

Page

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 23584-1 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*.

ISO 23584 consists of the following parts, under the general title *Optics and photonics — Specification of reference dictionary*:

— *Part 1: General overview on organization and structure*

— *Part 2: Classes' and properties' definitions*

Introduction

Modern business operations — known collectively as e-Business and including e-Marketplaces, e-Product catalogues and Lifecycle Management — are characterized by:

1) **Complex structures of the product lifecycle**

   In each step of the product lifecycle (ranging from the first idea through development, manufacture, distribution, use and disposal of the product) information from another step or other steps is required, moreover, new additional information in generated. Numerous parties and/or processes are involved in or form part of the product lifecycle. Hence information needs to be transferred to and/or exchanged between those parties and processes, across company internal interfaces and across interfaces to external business partners (such as other manufacturers, suppliers and customers).

   To ensure successful handling of these business operations it is essential that the communication between parties and processes involved be independent from individual agreements on data and that the data, once created, be readily usable by other parties and in other processes without a need for conversion mechanisms.

2) **Availability of new electronic media**

   Suppliers make efforts to provide such media and (potential) buyers are bombarded with this information, whilst missing transparency.

   To take advantage of the economic potential of these new media, product information provided by various suppliers must be clear and unambiguous (inter-comparable) for a potential buyer.

The requirement arising from both of these aspects is that the description of products and processes be:

— uniformly consistent and unambiguous;

— neutral (neither company-specific nor software-specific nor product-specific);

— available in electronic form for ready use without conversion.

This is generally true for any business area.

For the business area of optics and photonics, as regards optical data, the situation that led to the decision to prepare ISO 23584 was:

a) available ISO Standards such as the ISO 10110 series, describe the preparation of drawings and provide verbal definition of properties, but do not provide sufficient detail of information required for an unambiguous data exchange;

b) programs (i.e. software, either commercially available or custom-made) used in different areas of a single company or amongst business partners (e.g. Code V, Zemax, AutoCAD, HiCAD, MS Excel, SAP, etc.) use different interfaces and different internal data representation; any attempt to exchange data between them requires multi-directional conversion mechanisms or is associated with a risk of introducing errors or simply is impossible;

c) a consistent standardized terminology over the entire optics area does not exist.

On the basis of standardized and electronically available properties, data exchange between, and immediate use of transmitted data in, the programs (software) used in various departments or branches of one company

or at various business partners can be implemented. Use of standardized properties increases process comprehensiveness at companies and permits closer IT-based links between customers and suppliers in the areas of development and supply. This in turn leads to cost savings by way of cuts in the number of required parts and shorter product-development time frames.

Though limited to the field of optics and photonics, the reference dictionary must include all relevant properties required for the full description of optical products and processes. Therefore, in addition to the properties that are peculiar to the field of optics and photonics, the reference dictionary also includes, be it by specification or be it by reference from other dictionaries, properties being of universal nature rather than specific to “optics and photonics”, e.g. quantities and units or fundamental physical entities, and the required properties from other technical fields, e.g. mechanical components such as mountings for optical elements, if they are not defined elsewhere (i.e. in another PLIB standard) and so cannot be referenced.

In the interests of utmost effectiveness the reference dictionary and its entire content is made available in electronic form, ready for import into and use in a user's application system.

NOTE Ideally, the reference dictionary and its content will be available in the form of an online database. It is acknowledged, however, that the provision of ISO properties in an online database is a new approach in ISO and that no suitable ISO database is currently available to provide the content and to allow export and subsequent import into the application system of the user. Therefore, this part of ISO 23584 is made available in the conventional form, but is supplemented by the relevant data in processable form on CD-Rom or as a download.

Optics and photonics — Specification of reference dictionary —

Part 1: General overview on organization and structure

1 Scope

This part of ISO 23584 provides the basis for the preparation of a reference dictionary of standardized product properties for the area of optics and photonics, and for the provision of this reference dictionary and its entire contents in electronic form.

This part of ISO 23584, on the basis of the rules set forth in ISO 13584-42, IEC 61360-1 and in the ISO/IEC Guide 77-2 for specification of product properties and families, specifies a reference dictionary of standardized product properties for the area of optics and photonics.

The properties are determined on the basis of standardized attributes. To ensure optimum unambiguity the standardized properties are classified into definition classes forming a so-called standardized "reference hierarchy".

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 31 (all parts), *Quantities and units*

ISO 13584-42, *Industrial automation systems and integration — Parts library — Part 42: Description methodology: Methodology for structuring part families*

ISO 23584-2, *Optics and photonics — Specification of reference dictionary — Part 2: Classes' and properties' definitions*

IEC 61360-1, *Standard data element types with associated classification scheme for electric components — Part 1: Definitions — Principles and methods*

ISO/IEC Guide 77-2:2008, *Guide for specification of product properties and classes — Part 2: Technical principles and guidance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13584-42, IEC 61360-1 and in the ISO/IEC Guide 77-2 apply.

NOTE Some basic definitions and principles of key importance for the understanding of this part of ISO 23584 are provided in Annex A for information.

4 Principles of specification

4.1 General

Clause 4 of this International Standard attempts to outline the basic principles of specification in a simple language. Comprehensive description is available in the ISO/IEC Guide 77-2.

4.2 Set of attributes for description of a property

Properties are described by attributes. The set of attributes describing a property is as given in Tables 1 and 2.

NOTE The table contents is in accordance with the data model specified in ISO 13584-42, expanded where required as per ISO/IEC Guide 77-2.

Table 1 — Set of attributes for description of a property (ISO/IEC Guide 77-2)

Attribute [a,b]	Mandatory	Translation
Code	Y	N
Version	Y	N
Definition class	Y	N
Revision	Y	N
Date of original definition	Y	N
Date of current version	Y	N
Date of current revision	Y	N
Preferred name	Y	Y
Synonymous name	N	Y
Short name	N	Y
Definition	Y	Y
Source document of definition	N	Y
Note	N	Y
Remark	N	Y
Preferred symbol	N	N
Synonymous symbol	N	N
Figure	N	N
Property type classification	N	N
Domain	Y	N
Formula	N	N
Depends on	N	N
Value format	N	N
Unit of measure	Y/N	N
Alternative unit	N	N

[a] The contents of this table have been taken over from ISO/IEC Guide 77-2:2008, Table 1, where, additionally, a description of the meaning of each attribute is given.

[b] Additional attributes are included in the ISO/TC 172 database, see Table 2.

Table 2 — Additional ISO/TC 172 attributes for description of a property

Attribute	Mandatory	Translation
ownerTCSC	Y	N
liaisonTCSC	N	N
ebXML URI	N	N
Classification to ICS	Y	N

4.3 Set of attributes for description of a class

Classes are described by properties.

In addition, for the purpose of identification, each class is described by a set of attributes. The set of attributes describing a class is given in Tables 3 and 4.

NOTE The table contents is in accordance with the data model specified in ISO 13584-42, expanded where required in accordance with ISO/IEC Guide 77-2.

Table 3 — Set of attributes for description of a class (ISO/IEC Guide 77-2)

Attribute [a,b]	Mandatory	Translation
Code	Y	N
Version	Y	N
Information supplier	Y	N
Revision	Y	N
Date of original definition	Y	N
Date of current version	Y	N
Date of current revision	Y	N
Preferred name	Y	Y
Synonymous name	N	Y
Short name	N	Y
Definition	Y	Y
Source document of definition	N	Y
Note	N	Y
Remark	N	Y
its superclass	N	N
Applicable properties	N	N
Applicable types	N	N
Figure	N	N
Subclass selectors	N	N
Class selector values	N	N

[a] The contents of this table have been taken over from ISO/IEC Guide 77-2:2008, Table 6, where, additionally, a description of the meaning of each attribute is given.

[b] Additional attributes are included in the ISO/TC 172 database, see Table 4.

Table 4 — Additional ISO/TC 172 attributes for description of a class

Attribute	Mandatory	Translation
ownerTCSC	Y	N
liaisonTCSC	N	N
ebXML URI	N	N
Classification to ICS	Y	N

4.4 Basic structure of reference dictionary

4.4.1 General

For an unambiguous specification, each property requires a defined context. In accordance with the data model this context is provided by allocation of each property to an associated definition class.

NOTE The definition class is one of the mandatory attributes of a property.

When strictly applying the rules of the data model specified in ISO 13584-42, it is impossible to end up with object classes that describe objects in all detail. Therefore a clear distinction shall be drawn between definition classes and application classes. The properties defined in the definition classes of the property dictionary may – in the sense of their definition class, i.e. in the sense of their defined context – be used in any application class.

Within the hierarchic structure of definition classes and within the hierarchic structure of application classes the rules of heredity, in acordance with the data model of ISO 13584-42, apply.

4.4.2 Basic structure of the hierarchic order of the definition classes

The basic structure of the hierarchic order of definition classes of this part of ISO 23584 is adapted from the ICS (International Classification of Standards).

To achieve compatibility with the data model of ISO 13584-42, ICS classes are given a verbal definition and are related to each other by introduction of appropriate classifying properties. The ICS structure is modified to eliminate classes such as “miscellaneous”.

On the top level order of the ICS, besides generalities/terminology/standardization (ICS 01), we have the sciences and the industry sectors. Properties shall always be allocated to the most general possible class (here, ICS class), that is, if a property cannot be allocated to ICS 01 and its sub-classes, consideration shall be given to its allocation to the relevant science class, and only if this is not possible shall it be allocated to the relevant industry sector class.

4.4.3 Allocation of properties for basic quantities within the hierarchic order of definition classes

In order to allow non-contradicting properties' definitions, basic quantities shall be defined as general as possible. For physical quantities the specification of properties shall be based on ISO 31 and the properties will be allocated to the definition class “general terminology” in ICS 01.

If necessary for a specific area of application, a specialization may then be made starting from those properties for basic quantities available under the ICS 01 definition class, e.g. for introduction of conditions, restriction of value range etc., and will thus lead to additional (new) properties.

4.4.4 Basic structure of the hierarchic order of the application classes

Application classes allow the description of concrete objects by allocating to them (i.e. referencing) the relevant properties found in definition classes. These classes together with their (referenced) properties will be used for data interchange between business partners (company internal or external).

The top level order of application classes does not dispose of a classifying property, which yields that in principle all objects can be allocated to the same level of hierarchy. If, however, there is similarity of objects to be specified in application classes, then a hierarchic order within an application class may be built-up by use of classifying properties and application of the rules of the data model of ISO 13584-42.

NOTE In the database, a search functionality will facilitate the search for classes.

To facilitate the description of objects, where a specific set of functional or form elements will repeatedly occur, provision is made of a property of the type “class type”, which allows referencing the entirety of all properties associated with one particular class to another class.

5 ISO/TC 172 database

5.1 General

As stated in the Introduction in the interests of utmost effectiveness the reference dictionary shall be made available in electronic database form, ready for import into and use in a user's application system.

The URL of the ISO/TC 172 database is: www.tc172-prodic.net

This database is used by ISO/TC 172 as the central working tool in the process of development and maintenance of the reference dictionary for optics and photonics.

Free reading permission for the ISO/TC 172 database will be granted to any ISO/TC 172 member body on request. Experts nominated to actively participate in the project and in the future maintenance of the database standard will be granted free reading and writing permission, in accordance with the applicable maintenance procedure, on receipt of their formal nomination.

5.2 Identification of database items and their status

5.2.1 Identifier of database items

5.2.1.1 General

In accordance with ISO 13584-42 every property shall be unambiguously identifiable. To fulfil this requirement every entity has its unique identifier (ID). For the purposes of ISO 23584, the identifier is divided up into four fields, as follows (see Figure 1).

5.2.1.2 Information supplier

Every database entity has exactly one supplier organization, who is responsible for this entity. This supplier is described with a worldwide unambiguous identification. The registration of the supplier code may be made through different organizations.

The supplier code for the entities specified in the properties dictionary according to ISO 23584 is 0112/1///23584_x_1. The letter “x” represents the part number of ISO 23584 and will consist of one or more digits, as applicable, e.g. “2” in the case of ISO 23584-2, or “101” in the case of ISO 23584-101, etc. In the user interface of the ISO/TC 172 database the non-speaking supplier’s code is replaced and represented by the speaking term ISOTC 172.

For all data elements it is necessary to define a unique responsible “official owner of content”. In ISO this is usually an ISO Technical Committee or Subcommittee. In the database, this will be specified in an attribute field. For all items forming part of the ISO 23584 reference dictionary for optics and photonics ISO/TC 172 is the “official owner”. For items under the responsibility of another TC, that other TC is the “official owner”.