INTERNATIONAL STANDARD

**ISO 82045-5**

First edition
2005-07-15

# Document management —

## Part 5: Application of metadata for the construction and facility management sector

*Gestion de documents —*

*Partie 5: Application des métadonnées dans le secteur de la construction et de la gestion d'installation*



Reference number
ISO/FDIS 82045-5:2005(E)

# 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 82045-5 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 8, *Construction documentation*.

ISO/IEC 82045 consists of the following parts, under the general title *Document management*:

— *Part 1: Principles and methods*

— *Part 2: Metadata elements and information reference model*

— *Part 5: Application of metadata to the construction and facility management sectors*

Maintenance of the information reference model and archiving are to form the subjects of future Parts 3 and 4.

## Introduction

The approach taken by this part ISO/IEC 82045 is to be useful and sufficient for practice within its application domain, not to be a rich and all-encompassing set of metadata. It specifies subsets of the cross-industry standard presented in IEC 82045-1 and IEC 82045-2, and presents industry-specific details. It is suitable for all parties involved in preparing and using technical documentation and, although its specifications are primarily intended for document users, system developers are expected to develop tools capable of implementing and supporting its specifications.

# Document management —

# Part 5:
# Application of metadata for the construction and facility management sector



## 1 Scope

This part ISO/IEC 82045 specifies elements and methods for sharing and exchanging management data (metadata) for documents, to be used with electronic or paper-based document management systems. The document concept, which includes CAD files and all other information entities that need to be managed, is according to IEC 82045-1. The specific application domain of this part of ISO/IEC 82045 is the AEC and FM sectors.

## 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 635 (all parts), *Codes for the representation of names of languages*

ISO 5455:1979, *Technical drawings — Scales*

ISO 12006-2, *Building construction — Organization of information about construction works — Part 2: Framework for classification of information*

IEC 82045-1:2001, *Document management — Part 1: Principles and methods*

IEC 82045-2:2004, *Document management — Part 2: Metadata elements and information reference model*

## 3 Terms and definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in IEC 82045-1, IEC 82045-2 and ISO 12006-2 and the following abbreviated terms apply.

AEC architecture, engineering and construction

FM facility management

CAD computer aided design

DWF drawing web format [1)]

PDF portable document format [2)]

TIFF tagged image file format [3)]

## 4 Relationship of this part of ISO/IEC 82045 to IEC 82045-1 and IEC 82045-2

IEC 82045-1 provides general principles and methods for the use of metadata in management of technical product documents. It provides the framework for the other parts.

IEC 82045-2 presents an extensive model that specifies all metadata elements required for such document management, as well as a list including definitions for the metadata elements.

This part of ISO/IEC 82045 is primarily intended to give more extensive support to the practical use of metadata for construction projects and continued use of the information for facility management purposes. It is prescriptive to some extent, but also provides information to facilitate the understanding of metadata concepts and how to apply them in AEC and FM activities.

## 5 Document life-cycle in construction and facility management processes

### 5.1 General

This clause describes document management activities related to AEC/FM, where metadata are used to support the process. For each group of activities, guidelines on methods for creating, exchanging, using and storing metadata are given.

### 5.2 Producing construction documents

The creation of documents in a construction project is normally distributed among a number of participating organizations. Each of the participants may utilize any document management system, configured with the participant's own specific metadata set.

For sharing purposes, a well-defined *common metadata set* shall be used throughout the project. The project team shall define this set by selection from the elements of this part of ISO/IEC 82045. The values allowed for each metadata element, where not stated by the standard, can be specified on the national or project level.

### 5.3 Document exchange and distribution

In the design phase the responsibility for storing the original documents rests with each of the participants that produced the document. Current document versions are shared in a common location or distributed between the participants. Each *document version* shall be unambiguously identifiable and, in many cases, there is also a requirement to document the *distribution process*.



1) DWF is the trade name of a product supplied by Autodesk. This information is given for the convenience of users of this part of ISO 82045 and does not constitute an endorsement by ISO and IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

2) PDF is the trade name of a product supplied by Adobe Systems, Inc. This information is given for the convenience of users of this part of ISO 82045 and does not constitute an endorsement by ISO and IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

3) TIFF is the trade name of a product supplied by Aldus and Microsoft. This information is given for the convenience of users of this part of ISO 82045 and does not constitute an endorsement by ISO and IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

When documents are distributed, whether to a shared repository or to individual recipients, the above requirements shall be satisfied by means of accompanying metadata. Each system involved shall be able to produce metadata in a *standardized exchange format*. An example of such a format is given in IEC 82045-2, Annex B.

Each system involved shall also be able *to read the standardized exchange format*. Even if only a reduced subset of the metadata standard is used in a project, each system shall preserve all metadata received and be able to forward them to another system. This mechanism prevents metadata from being lost or destroyed when different systems interact during the document lifecycle, and enables reuse of information from different projects or archives.

In the design process, information about changes and the reason for them is vital, and the use of extensive metadata for this purpose will keep the change information tied to documents. Any reader will then be able to acquire this information directly and not have to rely on additional documents such as minutes or memoranda.

As a project enters the construction process, the immediate economic impact of documents increases, and so does the importance of securing correct access for all authorized participants to current versions of all documents. To accomplish this, each document shall have metadata to establish its *version identity*, a *document set* shall be defined for each distribution, and *distribution data* regarding all recipients shall be stored. In order to further confirm the distribution, *receipt data* may be added.

Access restriction and security grading may also be required. How to technically handle these requirements must be considered for each environment. Metadata can only communicate document properties, not ensure proper handling. Without reliable technical solutions for restricting access and ensuring security, documents with sensitive content should not be made available in shared storage repositories.

## 5.4 Checking and approving documents

When a document leaves the draft stage, information on *the progress of the approval process* shall accompany the document. Each participant in the process shall confirm a performed activity by adding to the metadata the status, his/her identity and, when applicable, comments. All status information should remain with the document at least until the workflow is completed and the document is finally approved.

## 5.5 Searching and retrieving documents

When searching documents, the primary properties are *identification and classification*. Additionally, keywords are very useful for archival retrieval purposes.

Typically, document identification for facility management includes the location of the facility, as well as the individual document identity and, when applicable, the object or space that is described by the document. Classification includes the document kind as well as classification of building elements or spaces. Classification of the process to which the document belongs may also be useful.

The use of *multiple presentation formats* should be considered. In addition to the native format, a common format for viewing may be supplied, such as TIFF, PDF or DWF, so that the original application software that created the document need not be present when using the document.

## 5.6 Reusing and revising documents

When information is to be reused, questions about its *accuracy and update status* may arise. These questions can only be answered if such information has previously been associated with the documents.

When using model-based information, the links/relations between different files or databases shall be preserved.

### 5.7 Archiving documents for later retrieval

In addition to the properties needed for searching and retrieving, archive documents also need to have some information that will help in keeping them accessible during the lifecycle. Such information is the original software used to create it and the anticipated time in which an update is needed.

For many documents their validity is limited in time, or the required time to store them in an archive is limited. Archive metadata should also contain information on when that period expires.

Searching in an archive also requires the metadata to include more information about the content of documents, since the user cannot be expected to have prior knowledge about the document content.

## 6 Mandatory and optional metadata for common sub-processes

Whether or not certain metadata elements will be mandatory is primarily determined by the context of the process. All metadata elements specified by IEC 82045-2 can be used as optional elements.

The following tables specify the metadata required for particular sub-processes within the application domain, in addition to a basic set of general metadata (see Table 1).

**Table 1 — General metadata elements**

| DMA [a] | Label | Obl [b] | Comment/Provision |
|---|---|---|---|
| 1 | Primary Document ID | **A** | Global ID, set at the origination of metadata. This is a unique identifier, which will distinguish the document from any other document. The domain shall be specified as “Global”. |
| 1 | Owner Document ID | B | Identifier that is issued by the organization where the document is created. Mandatory for all documents assigned a document number, e.g. drawings. Other documents are commonly identified by their title. Shall be unique within the specified document management domain. Additional document IDs may be set by different owners during the document life-cycle. They may be distinguished by different domain settings in accordance with IEC 82045-2. |
| 1 | Version ID | **A** | Identifier that distinguishes every stored version from other versions. Shall be independent of revision ID and status of the document. When applicable, the version ID is set automatically by the electronic document management system (EDMS version ID). |
| 1 | Revision ID | B | Required for all documents that are formally revised and approved. |
| 1 | Language code | B | Codes according to ISO 639 — only required when multiple or foreign languages are used within the document management domain. |
| 2 | Title | **A** | Clear text description(s) of the content of the document. |
| 2 | Keywords | B | Extra description for search. |
| 2 | Summary | B | Only needed when additional content information is considered essential for search purposes. |
| 3 | Document class name | **A** | At least according to document kind. Additional classification as required. Classification facets are specified in Clause 7. In the case of coded classification, the document class code is the primary classification element. |
| 4 | Status | **A** | Related to activities concerning the document; checking, commenting and approval. |
| 5 | Creator | **A** | Originating person. May contain contact information, see example in IEC 82045-2. |
| 5 | Creator organization | **A** | Originating organization. May contain contact information, see example in IEC 82045-2. If no organization was involved, use a single hyphen (-) to indicate this. |

**Table 1** (*continued*)

| DMA [a] | Label | Obl [b] | Comment/Provision |
|---|---|---|---|
| 5 | Responsible organization | B | When other than the author. May contain contact information, see example in IEC 82045-2. |
| 5 | Preparation date | **A** | For each document version. |
| 9 | Security level | B | Only required when classified information is present. |
| 9 | Access rights profile | B | Only required when needed for setting access rights of a receiving system. In reality, access is often based on classification (e.g. technical discipline) or organizational metadata (e.g. company or role). |
| 14 | File format | B | Only required when not evident by the file name or otherwise. |

**A** Mandatory

B Conditional

[a] Document management activity, according to IEC 82045-2.

[b] Obligation. Some conditions are subject to agreement within the project or organization.

The metadata given in Table 2 are essential for the management of documents in a shared environment, where documents are transferred from and to the participants in a construction project.

**Table 2 — Additional metadata elements for document sharing in project phase**

| DMA [a] | Label | Obl [b] | Comment/Provision |
|---|---|---|---|
| 3 | Document class | B | Complementing classification, document kind being the primary facet, with other facets according to Clause 7. Drawing scale for all documents that should be presented at a defined scale. |
| 6 | Reviewed by | B | Reviewing person. May contain contact information. |
| 6 | Reviewing organization | B | Reviewing organization. May contain contact information. |
| 6 | Review date | B | |
| 7 | Approved by | B | Approving person. May contain contact information. |
| 7 | Approving organization | B | Approving organization. May contain contact information. |
| 7 | Approved date | B | |
| 10 | Project name | **A** | Clear text, shared by all actors in the project. |
| 10 | Project ID | B | Project number or designation, assigned within an organization, usually the company where the document was created. Additional project IDs may be set, distinguished by the domain attribute. |

**A** Mandatory

B Conditional

[a] Document management activity, according to IEC 82045-2.

[b] Obligation. Some conditions are subject to agreement within the project or organization.

The metadata given in Table 3 are used for the purpose of defining a set of documents that together form a package, for distribution or other purposes.

**Table 3 — Additional metadata elements for document exchange**

| DMA [a] | Label | Obl [b] | Comment/Provision |
|---|---|---|---|
| 1 | Document set ID | **A** | ID for the set of documents forming the distribution, type of Document ID (DMA 1). |
| 2 | Title | **A** | Title for the document set. |
| 12 | Referred document ID<br>Referred document version ID | B | Reference to document ID and document version ID for each document that composes the document set. Document version ID may be omitted if the version is considered of no importance for the purpose of the document set. |
| 16 | Date of distribution<br>Purpose of distribution<br>Required action<br>Distribution recipient name<br>Distribution receipt acknowledgement date | B | These elements shall be used when required for documentation of the distribution of the document set. |
| **A** Mandatory<br>B Conditional | | | |
| [a] Document management activity, according to IEC 82045-2.<br>[b] Obligation. Some conditions are subject to agreement within the project or organization. | | | |

Table 4 gives metadata essential for storage and retrieval of documents in an archive.

**Table 4 — Additional metadata elements for archiving**

| DMA [a] | Label | Obl [b] | Comment/Provision |
|---|---|---|---|
| 3 | Coded presentation size | B | Original size for printing, using standard codes. Default coding system is according to ISO 5457. |
| 8 | Release status | **A** | Released/not released for use for a defined purpose. |
| 8 | Release purpose | B | Only when release status is “released”. |
| 8 | Releasing organization | B | The organization that released the document for its purpose. |
| 8 | Released by | B | The person who released the document. |
| 13 | Archiving organization | B | Only when required within an organizational context comprising several units. |
| 14 | File format | **A** | Essential for later access to the document. Should include file format version. |
| 14 | Creating system | **A** | Essential for later access to the document. |
| 14 | Compression system | B | Only when compressed files are archived. |
| 14 | File name | **A** | Complemented by file path as required for managing the file. |
| 14 | Character set | B | Appropriate when multiple character sets might be used. |
| 17 | Archiving date | **A** | None. |
| 17 | Archiving expiration date | B | Only when the date is determined beforehand, otherwise it can often be derived from the archiving date. |

**Table 4** (*continued*)

| DMA [a] | Label | Obl [b] | Comment/Provision |
|---|---|---|---|
| 17 | Next refresh date | **A** | Indicating the time when a refresh and/or file format update is recommended, depending on the physical data medium and the application program needed for accessing the contents of the document. |
| 17 | Archive location | **A** | The physical location of the archived document; building and room designation, cabinet, physical media identity, etc. |

**A** Mandatory

B Conditional

[a] Document management activity, according to IEC 82045-2.

[b] Obligation. Some conditions are subject to agreement within the project or organization.

# 7 Classification metadata

## 7.1 General

The metadata element *Document class* can be used for any kind of classification. A basic principle is to classify the documents using independent combinations, often referred to as *faceted classification*.

For the purpose of AEC/FM technical documentation, the most frequent classification facets are described below. These shall be regarded as a basic set, which may be complemented by other facets as required. Classification tables for the various facets may be standardized on the national level, or within the document management domain if national tables are not available.

NOTE The code examples of 7.8 and Clause 8 are not normative, but are given solely for information.

## 7.2 Document kind

According to IEC 61355, *document kind* is a document defined with respect to its specified content of information and form of presentation.

EXAMPLE Plan drawing, time schedule, minutes.

## 7.3 Documentation purpose

According to IEC 61082-1, *documentation* is a collection of documents related to a given subject. During the construction and FM processes, documentation is defined for a number of purposes. The *purpose* is normally associated with a stage in the process.

EXAMPLE Client's brief, tendering document, as-built documentation.

In order to further specify the content of a released set of documents for a defined purpose, the metadata for document set shall be utilized. See also 7.4.

## 7.4 Discipline

*Discipline* is the technical or professional domain covered by the information in a document. Normally, the discipline is directly related to an acting organization in the project or process.

EXAMPLE Architecture, structural engineering, project management.

## 7.5 Element

Classification according to *element* (defined according to ISO 12006-2 as a construction entity part which, in itself or in combination with other such parts, fulfils a predominating function of the construction entity) may be applied to any document that describes specific elements or groups of elements on any level. Most drawings and technical specifications can benefit from this form of classification. Examples of elements at a general level are ventilation systems and structural systems; at a more detailed level, columns and suspended ceilings.

## 7.6 Drawing scale

This is applicable to the presentation on drawings and other graphic documents intended to be presented to a specific scale. The main purpose of classification by drawing scale is to enable the search for documents with specific levels of detail. The classification shall specify the primary scale for the document. Multiple-scale classification is allowed whenever more than one scale can be considered equally important.

Values according to ISO 5455 shall be given whenever applicable. Even when a value is not covered by ISO 5455, the syntax 1:n should be used in order to enable processing of the value.

## 7.7 Other classifications related to construction works

Other classifications in accordance with ISO 12006-2 are preferred wherever applicable.

## 7.8 Example of multiple classification

Using faceted classification means that the metadata file can contain a number of classification metadata elements. The following application example describes part of the metadata classifying a document. The first four classes refer to national classification systems, the fifth to an International Standard, while the sixth illustrates a project-specific classification system.

NOTE The syntax used is identical to the example given in IEC 82045-2:2004, Appendix B.4.

```
<DocumentClassification ClassificationSystemId="NationalDocumentKind">
        <ClassId></ClassId>
        <ClassName LanguageCode="en">CAD Model</ClassName>
    </DocumentClassification>

    <DocumentClassification ClassificationSystemId="NationalDocumentPurpose">
        <ClassId></ClassId>
        <ClassName LanguageCode="en">As Built</ClassName>
    </DocumentClassification>


    <DocumentClassification ClassificationSystemId="NationalDiscipline">
        <ClassId>S</ClassId>
        <ClassName LanguageCode="en">Structural engineering</ClassName>
    </DocumentClassification>


    <DocumentClassification ClassificationSystemId="NationalElement">
        <ClassId>27</ClassId>
        <ClassName LanguageCode="en">Loadbearing Structure</ClassName>
    </DocumentClassification>


    <DocumentClassification ClassificationSystemId="ISO5455">
        <ClassId></ClassId>
        <ClassName LanguageCode="en">1:50</ClassName>
    </DocumentClassification>
```