INTERNATIONAL STANDARD

ISO 15926-1

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Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities —

Part 1: Overview and fundamental principles

Systèmes d'automatisation industrielle et intégration — Intégration de données de cycle de vie pour les industries de «process», y compris les usines de production de pétrole et de gaz —

Partie 1: Vue d'ensemble et principes fondamentaux

Reference number
ISO 15926-1:2004(E)

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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 15926-1 was prepared by Technical Committee ISO/TC184, *Industrial automation systems and integration*, Subcommittee SC4, *Industrial data*.

ISO 15926 consists of the following parts, under the general title *Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities*:

— *Part 1: Overview and fundamental principles*

— *Part 2: Data model*

0 Introduction

0.1 Background

Information concerning the engineering, construction and operation of process plants is created, used and modified by many different organizations throughout a plant's life. Economic, safety and environmental considerations demand that this information is available to owners and operators of facilities, contractors, and regulatory bodies in a consistent, integrated form. This requirement can be satisfied by specifications that prescribe the structure and meaning of data that is shared by organizations and disciplines involved in all stages of a plant's life-cycle.

The need to increase the cost efficiency of process plants is leading to business practices that depend on the efficient integration and sharing of plant information in a computer processable form. These business practices include the following.

— Many users' needs now span more than one of the traditional information views. Safety and environment are two examples of this.

— Concurrent engineering requires design work to progress in parallel, with the state of the design being available electronically, in computer processable form, to other engineering, planning, purchasing and logistical activities.

— Significant cost savings are expected from standardization of component specifications. The information about these specifications is required in computer processable form for easy incorporation into plant designs and requirements.

— In the past, hand-over of plant design information was often restricted to design drawings and paper documents. Use of this information in managing the operation and modification of the plant was restricted to manual processes, or the information had to be redefined in a format suitable to the required application. Having the plant design and equipment information in computer processable form increases the efficiency and effectiveness of the operational phase of the plant.

— Accurate computer processable information about a plant's performance throughout its lifetime is of high value, for optimising future modifications to the plant and for designing new plants on the basis of experience with existing plants.

By using a consistent context for data definitions, the information used in the various aspects of the plant's life-cycle can be brought together. This allows information to be integrated, shared and exchanged in a consistent, computer processable form.

0.2 Purpose of ISO 15926

The purpose of this International Standard is to facilitate integration of data to support the life-cycle activities and processes of process plants. To do this, this International Standard specifies a data model that defines the meaning of the life-cycle information in a single context supporting all the views that process engineers, equipment engineers, operators, maintenance engineers and other specialists may have of the plant.

Traditionally, data associated with a process plant have been concentrated on some individual view of the plant at a point in time. Such data are usually defined and maintained independently of other groups of users, resulting in duplicated and conflicting data that cannot be shared either within an enterprise or with business partners of an enterprise.

0.3 Description of ISO 15926

ISO 15926 is an International Standard for the representation of process plant life-cycle information. This representation is specified by a generic, conceptual data model that is suitable as the basis for implementation in a shared database or data warehouse. The data model is designed to be used in conjunction with reference data, i.e. standard instances that represent information common to a number of users, process plants, or both. The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model.

ISO 15926 is organized as a series of parts, each published separately. This part of ISO 15926 provides an overview. It specifies the contents and functions of the different parts of ISO 15926 and the relationships between them, and describes:

— an overview of ISO 15926;

— the fundamental principles that are the basis of ISO 15926;

— the relationship of ISO 15926 to other industrial data standards;

— definitions of terms used throughout ISO 15926.

0.4 Typographical conventions

The following typographical conventions are used in this International Standard.

A numbered reference enclosed in brackets (for example, “[2]”) is a reference to a document that is listed in the Bibliography.

In this International Standard the same English language words may be used to refer to an object in the real world or to a concept, and as the name of an EXPRESS data type that represents this object or concept. The following typographical convention is used to distinguish between these. If a word or phrase occurs in the same typeface as narrative text, the referent is the object or concept. If the word or phrase occurs in a bold typeface, the referent is the EXPRESS data type. Names of EXPRESS schemas also occur in a bold typeface.

The name of an EXPRESS data type may be used to refer to the data type itself, or to an instance of the data type. The distinction between these uses is normally clear from the context. If there is a likelihood of ambiguity, the phrase “entity data type” or “instance(s) of” is included in the text.

Double quotation marks “ ” denote quoted text. Single quotation marks ‘ ’ denote particular text string values.

Some components of this International Standard are available in electronic form. This access is provided through the specification of Universal Resource Locators (URLs) that identify the location of these files on the Internet. If there is difficulty accessing these files contact the ISO Central Secretariat, or contact the ISO TC 184/SC4 Secretariat directly at: sc4sec@tc184-sc4.org.

0.5 Target audiences

The target audiences for this part of ISO 15926 are as follows:

— technical managers wishing to determine whether ISO 15926 is appropriate for their business needs;

— implementers wishing to obtain an overview of the contents of ISO 15926.

Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities —

Part 1: Overview and fundamental principles

1 Scope

This International Standard specifies a representation of information associated with engineering, construction and operation of process plants. This representation supports:

— the information requirements of the process industries in all phases of a plant's life-cycle;

NOTE 1 The process industries include those involved in oil and gas production, refining, power generation, and manufacturing of chemicals, pharmaceuticals, and food.

— sharing and integration of information amongst all parties involved in the plant's life-cycle.

The following are within the scope of ISO 15926:

— a generic, conceptual data model that supports representation of all life-cycle aspects of a process plant;

— reference data that represents information common to many process plants and users;

— scope and information requirements for additional reference data;

— methods for the analysis of requirements and development of reference data;

— procedures for registration and maintenance of reference data;

— templates for the exchange of data used in a particular context and their mapping to the conceptual data model;

— methods for the development of such templates and their mapping to the conceptual data model;

— conformance to the requirements of this International Standard.

The scope of business activities that are supported by this International Standard is illustrated in Figure 1, which shows the main activities and data flows associated with the life-cycle of a plant.

NOTE 2 Figure 1 is based on the Process Plant Engineering Activity Model [6].

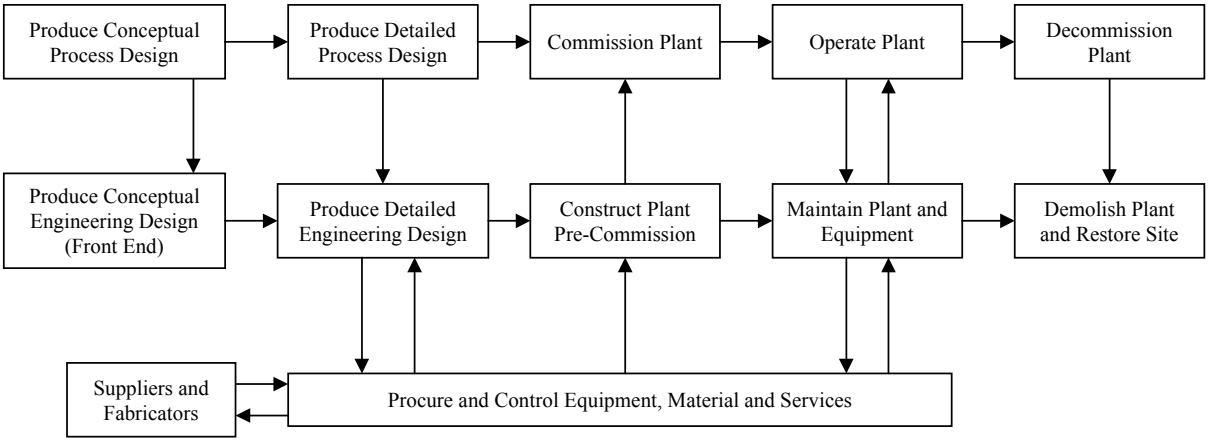

Figure 1 – Activity model of the process plant life-cycle

NOTE 3 The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model defined in ISO 15926-2.

EXAMPLE A reference data library covering technical data about process systems, electrical systems and instrumentation systems can support design, engineering and maintenance activities for these systems within a process plant.

The following are outside the scope of ISO 15926:

— commercial, business, and administrative data that are not directly related to the engineering, operation and maintenance of process plants.

This International Standard is applicable to implementation of databases or data warehouses that enable integration and sharing of data amongst different participants in the life-cycle of a process plant. The generic data model specified in ISO 15926-2 provides a suitable conceptual data model for such a database or data warehouse.

NOTE 4 See 5.2 for further information concerning the nature of conceptual data models.

This part of ISO 15926 provides an overview of this International Standard. The scopes of the other parts of ISO 15926 are defined within those parts.

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/IEC 8824-1:1995, *Information technology — Open systems interconnection — Abstract syntax notation one (ASN.1) — Part 1: Specification of basic notation*.

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles.*

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: The EXPRESS language reference manual*.

ISO 10303-21:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure*.

ISO 10303-22:1998, *Industrial automation systems and integration — Product data representation and exchange — Part 22: Implementation methods: Standard data access interface*.

ISO/TS 10303-28:2003, *Industrial automation systems and integration — Product data representation and exchange — Part 28: Implementation methods: XML representations of EXPRESS schemas and data*.

ISO 15926-2, *Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities — Part 2: Data model*.

ISO 13584-1:2001, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles.*

ISO/TS 18876-1, *Industrial automation systems and integration — Integration of industrial data for exchange, access, and sharing — Part 1: Architecture overview and description*.

ISO/TR 9007:1987, *Information processing systems — Concepts and terminology for the conceptual schema and the information base*.

3 Terms, definitions, and abbreviations

3.1 Terms and definitions

For the purposes of this part of ISO 15926, the following terms and definitions apply.

NOTE Definitions copied verbatim from other standards are followed by a reference to the standard in brackets, such as "[ISO 10303-1]". In these cases the definition in the referenced document is normative; its repetition here is informative and in the case of any discrepancy the definition in the referenced document has precedence. An explanatory note follows definitions that have been adapted from other standards. In these cases the definition given here is normative for the purposes of this part of ISO 15926.

3.1.1
class
category or division of things based on one or more criteria for inclusion and exclusion

NOTE 1 A class need not have any members (things that satisfy its criteria for membership).

NOTE 2 Because of the spatio-temporal paradigm used to define individuals in this International Standard, all classes are non-well-founded sets. These are explained in ISO 15926-2:D.2.4

3.1.2
commodity product class
manufactured product class whose members conform to open agreed standards

NOTE Commodity product classes have sufficient characterisation to indicate suitability of use. They are specializations of one or more de facto classes, standard classes, or both. The resulting specification is non proprietary as no one organization controls it.

EXAMPLE The type of lightbulb known as 60 W 230 V E27 is a commodity product class.

3.1.3
conceptual data model
data model in the three schema architecture defined by ISO/TR 9007, in which the structure of data is represented in a form independent of any physical storage or external presentation format

NOTE Adapted from the IDEF1X specification [4].

3.1.4
core class
class that is a commonly used subdivision corresponding to terms used in common language

NOTE The conditions for membership are often not formally defined; understanding of the class may be conveyed by example.

EXAMPLE Pipe, floor, pump, and light bulb are all core classes.

3.1.5
data
representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[ISO 10303-1]

3.1.6
data store
computer system that allows data to be stored for future reference

3.1.7
data warehouse
data store in which related data are merged to provide an integrated set of data containing no duplication or redundancy of information, and which supports many different application viewpoints

3.1.8
de facto class
class corresponding to common natures that are widely recognized but not formally agreed or defined

NOTE De facto classes may be formalized by international, national, or industry agreement.

EXAMPLE 1 A manufacturer may choose to make a product of similar specification to that of another manufacturer in order to compete for the market share by choosing to conform to some characteristics of the other product.

EXAMPLE 2 3.5” floppy disk and HB pencil are de facto classes.

3.1.9
exchange file
computer-interpretable format used for storing, accessing, transferring and archiving data

NOTE Adapted from the definition of “exchange structure” in ISO 10303-1.

3.1.10
implementation method
technique used by computer systems to exchange or access data that is described using the EXPRESS data specification language

NOTE Adapted from ISO 10303-1.

3.1.11
individual
thing that exists in space and time

NOTE 1 In this context existence is based upon being imaginable within some consistent logic, including actual, hypothetical, planned, expected, or required individuals.

EXAMPLE A pump with serial number ABC123, Battersea Power Station, Sir Joseph Whitworth, and the Starship "Enterprise" are examples of individuals.

NOTE 2 See ISO 15926-2, 4.7, for a detailed discussion of the concept of individuals.

3.1.12
information
facts, concepts, or instructions

[ISO 10303-1]

3.1.13
instance
data that represents, in computer processable form, some real-world thing

NOTE This is different from the ISO 10303-11 definition due to its use for reference and life-cycle data.

3.1.14
manufactured product class
class whose members are individuals produced by a manufacturing process

NOTE 1 The members of a manufactured product class may be discrete or may be batches or continuous flows, such as process fluids.

EXAMPLE 1 "Lightbulbs 60 W 230 V E27" is an example of a manufactured product class whose members are discrete.

EXAMPLE 2 "BS4040 Leaded Petrol" is an example of a manufactured product class whose members are continuous.

NOTE 2 A manufactured product class may correspond to a specification that has not been realized, such a product specification for which no products have been made.

3.1.15
process plant life-cycle data
data that represents, in computer processable form, information about one or more process plants in or throughout any phases of their life

NOTE The phases of the life of a process plant may include design, engineering, construction, operation, maintenance, decommissioning and demolition.

3.1.16
proprietary class
class whose specification for membership is owned, controlled, or protected by an organization and is not generally available outside that organization

3.1.17
proprietary product class
class that is a manufactured product class and a proprietary class

NOTE Proprietary product classes are specializations that depend on rules of inclusion and exclusion some of which are controlled in a closed way. This means that some aspects of the specification can be arbitrarily changed. Many proprietary product classes are specializations of commodity product classes, de facto classes, or both, where the additional restrictions reflect design or manufacturing details that the manufacturer uses to differentiate his product from others of the same general type.

EXAMPLE 1 A product specification that is owned by a commercial organization, and is marketed under and protected by a registered trade name, is the basis for a proprietary product class.

EXAMPLE 2 Lightbulbs 60 W 230 V E27 manufactured by Phillips are members of a proprietary product class.

3.1.18
reference data
process plant life-cycle data that represents information about classes or individuals which are common to many process plants or of interest to many users

3.1.19 reference data library (RDL)
managed collection of reference data

3.1.20
standard class
class whose specification for membership is owned or controlled by a standardization body and is publicly available

NOTE Standard classes result from the work of national, international, or industry standardization bodies and cover sizes, shapes, materials, performance, and manufacturing processes of equipment and materials. The rules for exclusion and inclusion (or conformance) are agreed by an open, consensus process and are made publicly available. A standard class may only constrain one particular aspect and often be insufficient to determine usage or full manufacturing specifications.

EXAMPLE 1 The ASME B16.9 standard [3] constrains the dimensions and shapes of steel buttwelding pipe fittings.

EXAMPLE 2 The IEC 60079-1 [2] standard specifies constraints on electrical equipment to ensure standard degrees of explosion proofness.

3.2 Abbreviations

For the purposes of this part of ISO 15926, the following abbreviations apply.

API application programming interface

RDL reference data library (see 3.1.19)

4 Overview of ISO 15926

ISO 15926 is divided into a number of parts. Each part has a unique function.

— ISO 15926-1 (this part) provides an overview of ISO 15926.

— ISO 15926-2 specifies a generic, conceptual data model that supports representation of all life-cycle aspects of a process plant.

— ISO 15926-4 defines a reference data library that can be periodically updated by a competent body, designated by ISO as a registration authority, which has the requisite infrastructure to ensure the effective use of the reference data library.

— ISO 15926-5 specifies the procedures to be followed by a registration authority for reference data.

— ISO 15926-6 specifies the information required when defining additions to the reference data specified in ISO 15926-4.

5 Fundamental principles

5.1 Architecture

The architecture that underlies this International Standard is illustrated in Figure 2. The architecture is an example of that described in ISO 18876-1. This International Standard supports integration over a wide context due to the nature of the generic, conceptual data model that is its foundation. Process plant life-cycle data is structured according to the data model defined in ISO 15926-2. This data is divided into data about an individual process plant, and reference data, which represents information that is common to many process plants or of interest to many users.

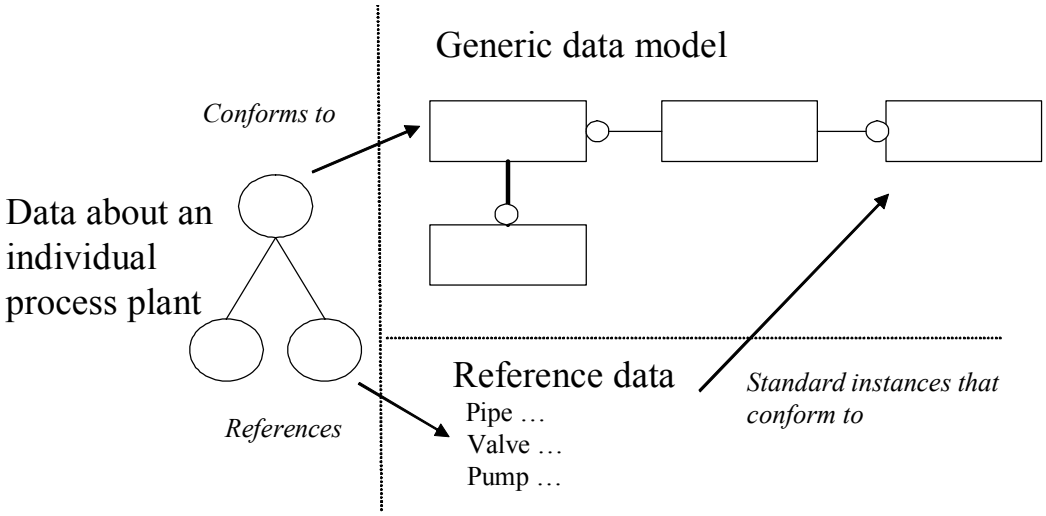

Figure 2 – Architecture

Reference data provides consistency of meaning within and across multiple sets of process plant data.

The data model defined in ISO 15926-2 supports representation of both classes (see 3.1.1) and individuals (see 3.1.11) as instances with attribute values. Characteristics common to the class members are defined once as computer processable data. Characteristics of particular items are then specified by reference to the appropriate classes.

EXAMPLE An individual pipe may be identified as a member of the class “6 inch pipe”, thereby specifying the particular pipe’s dimensions to be within the range of possible dimensions specified for the class.

Information about particular items that conform, or are intended to conform, to standards or to standardized engineering practices is represented in a concise and accurate form, without duplication. The detailed classes that have been recognised in the information associated with process plants are defined as reference data.

5.2 Conceptual data models

The data model specified in ISO 15926-2 is a conceptual data model as described in the three schema architecture of ISO/TR 9007.

The model excludes all business rules that are appropriate to specific applications, to enable integration of information and to give a stable and flexible model with respect to developing and changing business practices.

The three schema architecture identifies three types of data model:

— External model: the data structure corresponds to a view of data for a particular purpose that includes rules about the data that are appropriate to the particular purpose.

— Conceptual data model: a neutral model that is capable of supporting any valid view that falls within its scope. Such models can only include rules for data that are universally true across its entire scope for the envisaged life of the model. As a consequence most rules or constraints arising from particular business uses of data are excluded from conceptual data models.

— Physical model: a definition of the way data is stored. The entity data types reflect things that are important for storage and access and not the business meaning of the data.

These concepts are illustrated in Figure 3.

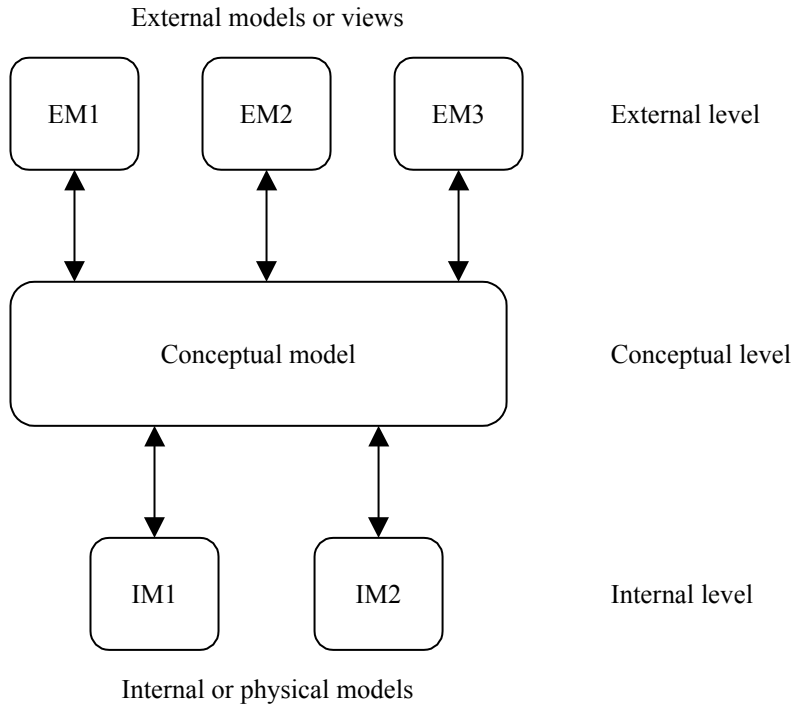

Figure 3 – Three schema architecture

5.3 Reference data

As shown in Figure 2, use of this International Standard is dependent on shared reference data. Data about an individual process plant can be shared and exchanged only if both the sender and the receiver use the same reference data or use common reference data. This reference data shall be suffi-

cient to ensure unambiguous communication between parties. The data model specified in ISO 15926-2 supports exchange of data but does not provide sufficient specific meaning of data to enable unambiguous communication.

NOTE A reference data library that is used to support unambiguous exchange or sharing of data can be standardized or can be developed and agreed by the communicating parties.

Reference data is divided into the following:

— instances that represent reference individuals;

EXAMPLE The European Datum of 1950 (ED50) located at the geodetic observatory at Potsdam near Berlin is a reference individual.

— instances that represent reference classes.

The latter division of reference data is further subdivided into the following categories:

— core classes (see 3.1.4);

— proprietary classes (see 3.1.16);

— de facto classes (see 3.1.8);

— standard classes (see 3.1.20);

— manufactured product classes (see 3.1.14);

— commodity product classes (see 3.1.2);

— proprietary product classes (see 3.1.17).

The relationship between the different class types is illustrated in Figure 4 below.

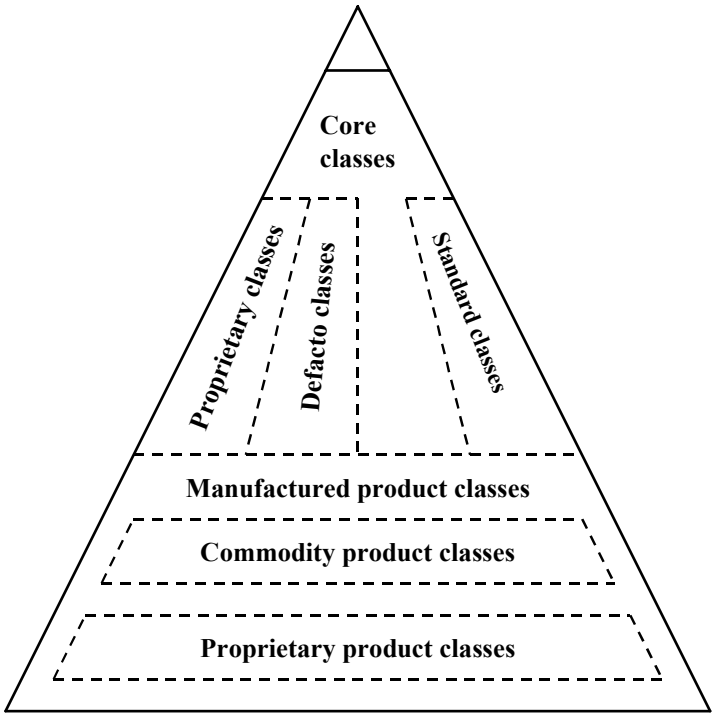

Figure 4 – Types of classes

The position of a class relative to the top and base of the triangle indicates the degree of definition. Classes at the top are general and have few restrictions on membership, whereas those at the base are more specific. Classes at the base of the triangle are specializations of the ones above, and so on up the triangle.

5.4 Registration and maintenance of reference data

As described in 5.1, implementation and use of this International Standard requires both a conceptual data model and reference data. The conceptual data model is specified in ISO 15926-2. A reference data library may not include all reference data that is required for all implementations of this International Standard. Reference data can be added, removed or updated and new revisions of the reference data library published, as shown in Figure 5. ISO 15926-5 and ISO 15926-6 describe this process.

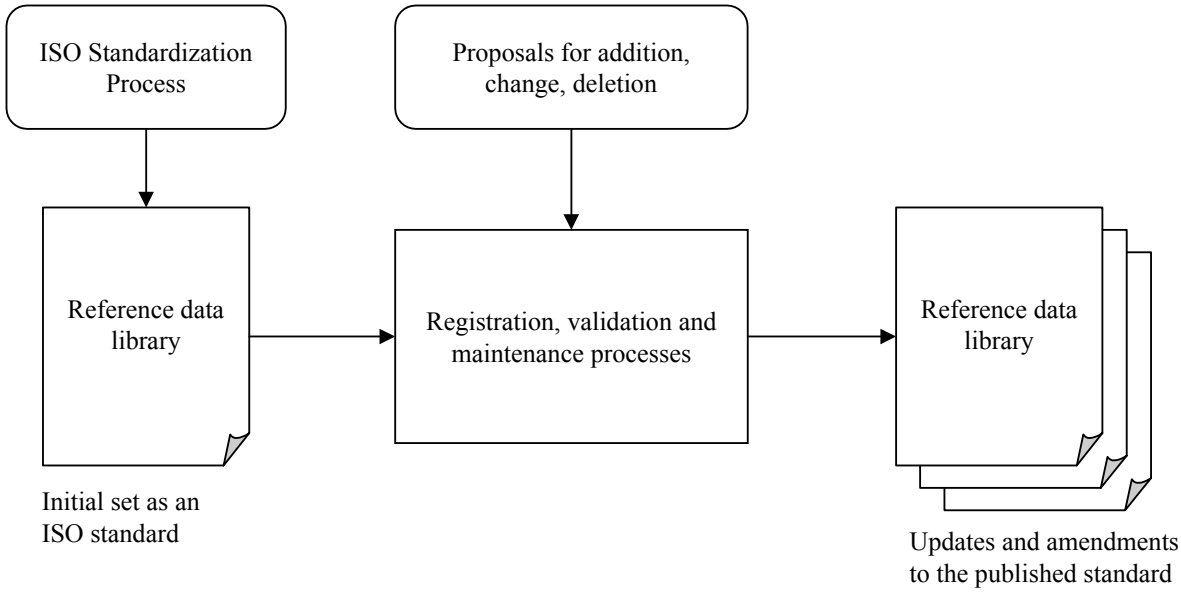

Figure 5 – Maintenance of reference data

6 Conformance

6.1 Overview

The conformance requirements of this International Standard state how the data model defined in ISO 15926-2 and reference data constrain conforming computer implementations.

Conformance to this International Standard is defined for the following.

— An exchange file encoded according to ISO 10303-21 or ISO/TS 10303-28 and the model specified in ISO 15926-2.

— A database, data warehouse, or other information system that supports storage, management, manipulation, and retrieval of data according to the model specified in ISO 15926-2.

NOTE Such an implementation of the International Standard provides at least one of the following services:

— providing persistent storage of instances that conform to the data model specified in ISO 15926-2;

— providing facilities to create, read, update, and delete instances;

— providing capabilities to merge different collections of instances.

Conformance of database, data warehouse or other information systems is described in terms of the interfaces that the system supports with respect to two system implementation forms, as follows.

— An exchange file interface that allows conformant exchange files to be written or read by the system.

— An application programming interface (API) whereby data can be stored and then data added, deleted, updated and queried. Two levels of API conformance are specified:

  — a general level that is not specific to any implementation technology;

— a specific level based on ISO 10303-22.

NOTE ISO 15926-2 specifies a conceptual model; therefore this International Standard does not prescribe the structures of any database or other implementation.

The information content of a conforming implementation of this International Standard may be constrained to include part or all of the reference data described in a specific reference data library.

6.2 Exchange files

An ISO 10303-21 exchange file conforms to the requirements of this International Standard if it satisfies the syntactic conformance requirements specified in ISO 10303-21, 5.3 and satisfies the schema conformance requirements specified in ISO 10303-21, 5.3 combined with the data model specified in ISO 15926-2. Every conforming exchange file shall apply the external mapping specified in 11.2.5.3 of ISO 10303-21, 11.2.5.3.

An ISO/TS 10303-28 exchange file conforms to the requirements of this International Standard if it satisfies the syntactic conformance requirements specified in ISO/TS 10303-28, 5.1.1 and XML document representation category LB, ETEB or OSEB requirements specified in ISO/TS 10303-28, 5.1.3 combined with the data model specified in ISO 15926-2.

6.3 Information system interfaces

6.3.1 Exchange file interface

An information system conforming to ISO 15926 shall provide an exchange file interface to read and write files that exhibit exchange file conformance as defined in 6.2.

Operation of the read interface shall result in the information encoded in the exchange file being available through the other interfaces of the system as instances that conform to the data model specified in ISO 15926-2.

EXAMPLE 1 If an exchange file that contains information about the design of a heat exchanger is presented to the exchange file interface of a system that conforms to ISO 15926, then that design information should be transferred into the internal data structures of the system and be available for use through any other system interface.

Operation of the write interface shall result in a selected set of instances being encoded as a conformant exchange file as defined in 6.2, where these instances:

— conform to the data model that is specified in ISO 15926-2;

— are stored in the conformant system.

EXAMPLE 2 If a conformant system holds information about pipes, piping components and their interconnections, the same information should be found in the resulting exchange file.

6.3.2 Application programming interface

6.3.2.1 General requirements

An information system conforming to ISO 15926 shall provide an API that enables instances to be manipulated by reference to their entity data types and their attribute types as defined by the data model specified in ISO 15926-2. The API shall support the following operations:

— creation of new instances of any valid entity data type, together with valid attribute values for these instances;

NOTE 1 The data model specified in ISO 15926-2 restricts the valid combinations of entity data types that may type an instance and the types of attributes the instance may have.

— deletion of instances;

— selection of groups of instances according to their entity data type(s) and attribute values.

NOTE 2 Due to the structure of the data model specified in ISO 15926-2 all instances are complex, with the exception of instances whose type is **thing** in combination with no subtypes.

EXAMPLE 1 Selection of instances whose type includes **thing** selects all instances in the data store.

EXAMPLE 2 Selection of instances whose type is exactly (**thing & class**) excludes instances of all subtypes of **class**, as well as instances of **individual** and **relation**.

An API implementation that claims conformance to this International Standard shall at least support the operations listed above.

6.3.2.2 Data access interface conforming to ISO 10303-22

An API implementation of this International Standard can also conform to ISO 10303-22 and so be consistent with one of the levels of transaction specified in ISO 10303-22, clause 11. Such an implementation shall combine the data access interface specification of ISO 10303-22, one or more SDAI language bindings, and the data model specified in ISO 15926-2.

7 Relationship to other industrial data standards

ISO 15926 can be used in conjunction with other standards for industrial data. Such standards fall into the following two categories:

— standards that specify the representation of industrial information within computer systems and communications between computer systems;

— standards that specify data elements and their meanings, independent of particular representation.

NOTE These categories are not mutually exclusive. Standards such as ISO 10303 Application Protocols specify the representation and meaning of data.

7.1 Industrial data representation standards

ISO 15926 is complementary to a number of other standards for the representation of industrial data.

7.1.1 ISO 10303 “Product data representation and exchange”

This International Standard makes use of ISO 10303-11 “EXPRESS” for specification of data models. Implementations of this International Standard may be based on any implementation method that has a mapping from EXPRESS.

EXAMPLE 1 Suitable implementation methods include ISO 10303-21, ISO 10303-22, and the Data Access and Exchange Facilities (DAEF) developed by the Petrotechnical Open Software Corporation (POSC) [5].

EXAMPLE 2 The ISO 10303-25 mapping from EXPRESS into the Unified Modeling Language, which is undergoing ISO standardization, is also a suitable implementation of this International Standard.

This International Standard supports representation of life-cycle data for process plants including oil and gas production facilities in a form that is suitable for implementation in a shared database or data warehouse. ISO 10303 Application Protocols provide specifications for the exchange of well-defined subsets of the total life-cycle data. Mappings can be defined between the data specification (AIM) of ISO 10303 Application Protocols and ISO 15926, where they overlap, as the basis for standard interfaces for the input or output of data stored in a database or data warehouse.

EXAMPLE 3 ISO 10303-212 [1] specifies how design information for electrotechnical plants and industrial systems can be exchanged. An interface conforming to ISO 10303-212 may be used to import or export electrotechnical design data that is stored within a database that is based on the data model specified in ISO 15926-2.

NOTE This International Standard does not specify such interfaces or transformations.

7.1.2 ISO 13584 "Parts library"

ISO 13584 provides a mechanism for representing manufacturers' and suppliers' product catalogue information. This mechanism is suitable for communication of catalogue information, and for the selection of parts based on a standard query interface specification. This mechanism provides an alternative representation for some of the information that can be represented using the data model specified in ISO 15926-2.

NOTE 1 ISO 13584 does not support all aspects of process plant information, and so precludes creation and maintenance of a single integrated data representation of this information.

Parts library information represented by ISO 13584 data can be referenced within data about an individual process plant or reference data that conforms to the data model specifed in ISO 15926-2. In particular, instances can record the following information:

— a thing is a member of class that is defined in an ISO 13584 compliant library;

— a thing possesses a property or characteristic that is defined in an ISO 13584 compliant library;

NOTE 2 The data model defined in ISO 15926-2 represents possession of properties or characteristics as membership of a class.

— a thing is a part that is defined in an ISO 13584 compliant catalogue;

— a thing is described by information that is represented within an ISO 13584 compliant library.

EXAMPLE The shape of members of a family of related parts can be described using a parametric representation within an ISO 13584 compliant library.

Exchange files that conform to ISO 13584 can be used to transfer manufacturers' data sheets and catalogues between implementations of this International Standard.

7.2 Product and manufacturing standards

Many products, processes and materials are the subject of standards that prescribe aspects such as form, function, properties, or manufacture. Many of these standards are published as text only, and are therefore not computer processable. The information that these standards contain, however, may be represented using reference data that conforms to this International Standard. This provides a mecha-

nism by which consistent representation of engineering information drawn from diverse international and national standards may be brought together for use in an enterprise or project.

NOTE Reference data libraries may include references to product and manufacturing standards.

Annex A
(normative)

Information object registration

To provide for unambiguous identification of an information object in an open system, the object identifier

```
{iso standard 15926 part{1} version {1}}
```

is assigned to this part of ISO 15926. The meaning of this value is defined in ISO/IEC 8824-1, and is described in ISO 10303-1.

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