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

Part 6: Methodology for the development and validation of reference data

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National foreword

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

Part 6: Methodology for the development and validation of reference data

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 6: Méthodologie pour le développement et la validation des données de référence

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*.

ISO 15926 is organized as a series of parts, each published separately. The structure of ISO 15926 is described in ISO 15926-1.

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

— *Part 1: Overview and fundamental principles;*

— *Part 2: Data model;*

— *Part 3: Reference data for geometry and topology* [Technical Specification]*;*

— *Part 4: Initial reference data* [Technical Specification]*;*

— *Part 6: Methodology for the development and validation of reference data* [Technical Specification]*;*

— *Part 7: Implementation methods for the integration of distributed systems: Template methodology* [Technical Specification]*;*

— *Part 8: Implementation methods for the integration of distributed systems: Web Ontology Language (OWL) implementation* [Technical Specification].

The following parts are under preparation:

— *Part 9: Implementation methods for the integration of distributed systems: Facade implementation* [Technical Specification]*;*

— *Part 10: Implementation methods for the integration of distributed systems:·Abstract·test·methods* [Technical Specification]*;*

— *Part 11: Methodology for simplified industrial usage of reference data* [Technical Specification].

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Introduction

ISO 15926 is an International Standard for the representation of process industries facility 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, production facilities, or both. The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model.

This part of ISO 15926 specifies the information that is required to be recorded for reference data items. This part of ISO 15926 contains examples of reference data items.

NOTE 1 These examples are not taken from ISO/TS 15926-4 or from any other standard. In some cases, the examples contain deliberate mistakes in order to show changes to a reference data library.

NOTE 2 A reference data library used with the ISO 15926 series of parts can be standardized or proprietary. A reference data library which is initially proprietary can subsequently be submitted for standardization. Classes contained within a reference data library can be more or less generic. Generic core classes and commodity classes are likely to be standardized, but specific manufactured product classes are unlikely to be standardized. The terms for the different types of class are defined in Clause 3.

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

Part 6: Methodology for the development and validation of reference data

1 Scope

This part of ISO 15926 specifies technical requirements for the structure and content of a reference data library.

The technical requirements are appropriate to a reference data library that is used with the ISO 15926 series of parts.

The following are within the scope of this part of ISO 15926:

— identification of a reference data item;

— information that defines a reference data item;

— administrative information about the source, the history of changes, and current status of a reference data and a reference data library;

— the way identification, defining information, and administrative data are recorded using ISO 15926-2;

— the reference data library that contains the reference data items necessary to record identification, defining information, and administrative data;

— the representation of the reference data library that is defined by this part of ISO 15926 as a spreadsheet;

— requirements for the representation of a reference data library.

The following are outside the scope of this part of ISO 15926:

— the definitions of the scope of reference data libraries within the ISO 15926 series of standards;

— methods and guidelines for implementing ISO 15926-2;

— the representation of a reference data library, that is not defined by this part of ISO 15926;

— procedures for the maintenance of reference data libraries.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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*

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ISO/IEC 11179-3:2013, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

ISO 80000-1, *Quantities and units — Part 1: General*

IETF RFC 2141, *URN syntax*[1)]

3 Terms, definitions, abbreviated terms and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
administered item
registered item for which administrative information is recorded

[SOURCE: ISO/IEC 11179-3:2013, 3.2.2]

3.1.2
administrative information
<metadata registry> information about the administration of an item in a metadata registry

[SOURCE: ISO/IEC 11179-3:2013, 3.2.3]

3.1.3
class
category or division of things based on one or more criteria for inclusion and exclusion

Note 1 to entry: A class need not have any members (things that satisfy its criteria for membership).

Note 2 to entry: 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.

[SOURCE: ISO 15926-1:2004, 3.1.1]

3.1.4
commodity product class
product class that has sufficient characterization to indicate suitability for a defined use, and that is an open agreed standard

Note 1 to entry: Often a commodity product class is defined by several other standards. A piping component typically conforms to a "shape standard" and a "material standard".

Note 2 to entry: Different manufactured product classes, which are specializations of the same commodity product class, are interchangeable for the use defined by the commodity product class.

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

[SOURCE: ISO 15926-1:2004, 3.1.2, modified]

3.1.5
core class
class that is a commonly used subdivision corresponding to terms used in common language

Note 1 to entry: 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.

1) Available at: http://www.ietf.org/rfc/rfc2141.txt

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[SOURCE: ISO 15926-1:2004, 3.1.4]

3.1.6
data
representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[SOURCE: ISO 10303-1:1994, 3.2.14]

3.1.7
de facto class
class corresponding to common natures that are widely recognized but not formally agreed or defined

Note 1 to entry: 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.

[SOURCE: ISO 15926-1:2004, 3.1.8]

3.1.8
information
facts, concepts, or instructions

[SOURCE: ISO 10303-1:1994, 3.2.20]

3.1.9
ISO 15926 conforming reference data library
ISO 15926 reference data library that conforms to the requirements of ISO/TS 15926-6

Note 1 to entry: An ISO 15926 reference data library can, but need not, conform to the requirements of ISO/TS 15926-6.

Note 2 to entry: An ISO 15926 reference data library can, but need not, be a standard.

3.1.10
ISO 15926 reference data library
reference data library that is recorded as instances of entities in ISO 15926-2

3.1.11
manufactured product class
class whose members are individuals produced by a manufacturing process

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

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

EXAMPLE 2 "BS 4040 Leaded Petrol" is an example of a manufactured product class whose members are continuous.

Note 2 to entry: 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.

[SOURCE: ISO 15926-1:2004, 3.1.14]

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3.1.12
physical quantity
property
aspect or quality of something that can be determined by measurement

Note 1 to entry: The term "property" is used in ISO 15926-2.

3.1.13
possible individual
thing that exists in space and time

Note 1 to entry: This definition is adapted from ISO 15926-2, within which "possible individual" is an entity, but not a defined term.

3.1.14
proprietary class
class whose specification for membership is owned, controlled, or protected by an organization and is not generally available outside that organization

[SOURCE: ISO 15926-1:2004, 3.1.16]

3.1.15
proprietary product class
class that is a manufactured product class and a proprietary class

Note 1 to entry: 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 Light bulbs 60 W 230 V E27 manufactured by Phillips are members of a proprietary product class.

[SOURCE: ISO 15926-1:2004, 3.1.17]

3.1.16
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

[SOURCE: ISO 15926-1:2004, 3.1.18]

3.1.17
reference data item
thing that is defined within a reference data library

Note 1 to entry: Each reference data item is an administered item.

3.1.18
reference data item definition by text
text, and optionally equations and figures, that is intended to be understood by a person, and that is the normative definition of a reference data item

3.1.19
reference data item definition by document reference
normative reference to a document that provides the normative definition of a reference data item

3.1.20
reference data item library record
reference data item and a set of statements about it within a reference data library

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3.1.21
reference data item non-person-interpretable identifier
text that is a unique identifier for a reference data item and that is not intended to be interpreted by a person

Note 1 to entry: The use of a reference data item non-person-interpretable identifier is defined in 5.2.

3.1.22
reference data item person-interpretable identifier
text that is a unique identifier for a reference data item, and that is intended to be interpreted by a person

Note 1 to entry: The use of a reference data item person-interpretable identifier is defined in 5.3.

Note 2 to entry: If a reference data item is a class, then its reference data item person-interpretable identifier may be a term.

Note 3 to entry: The reference data item person-interpretable identifier is used for all references to a reference data item in natural language text definitions.

Note 4 to entry: Names in natural language and terms in dictionaries are often unique only within a context. A reference data item may be used in many contexts. Hence a reference data item person-interpretable identifier may be longer than a name in a natural language, and contain words which qualify a natural language name, to ensure that it is unique.

Note 5 to entry: A reference data library may contain additional terms for a reference data item, which are not unique and which are used within particular contexts.

3.1.23
reference data library
managed collection of reference data

[SOURCE: ISO 15926-1:2004, 3.1.19]

3.1.24
standard class
class whose specification for membership is owned or controlled by a standardization body and is publicly available

Note 1 to entry: 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 ASME B16.9 **c**onstrains the dimensions and shapes of steel butt welding pipe fittings.

EXAMPLE 2 IEC 60079–1 specifies constraints on electrical equipment to ensure standard degrees of explosion proofness.

[SOURCE: ISO 15926-1:2004, 3.1.20]

3.1.25
statement
fact
information that is regarded as indivisible

Note 1 to entry: A statement can be recorded as an instance of the entity **relationship** in ISO 15926-2. A set of one or more statements can be recorded in shorthand form as a single item as an instance of a template, as defined in ISO/TS 15926-7.

3.1.26
thing
actual part of the real world, perceived part of the real world, or subject of thought

Note 1 to entry: A thing can be a material or non-material object, idea or action.

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Note 2 to entry: This definition is adapted from ISO 15926-2, within which "thing" is an entity, but not a defined term.

3.1.27
version of a reference data library
defined content from within a reference data library

Note 1 to entry: The content of a reference data library can change. A version of a reference data library cannot change.

Note 2 to entry: The formal definition of the class **version of a reference data library** in this part of ISO 15926 is "**multidimensional object** that is a set of things and a set of statements about the set of things, where the things and the statements are within a reference data library".

3.2 Abbreviated terms

ABNF Augmented BNF

API Application Programming Interface

BSU Basic Semantic Unit

OED Oxford English Dictionary

OWL Web Ontology Language

RDF Resource Description Framework

RDL Reference Data Library

URN Uniform Resource Name

URI Uniform Resource Identifier

UTC Coordinated Universal Time

3.3 Symbols for set theory operations

Symbol	Usage	Meaning of usage
∪	A∪B	union of sets A and B
∩	A∩B	intersection of sets A and B
¬	¬A	complement of set A
*	A*	power set of set A

4 Definition and content of a reference data library

4.1 A reference data item

A reference data item shall be an instance of an entity defined in ISO 15926-2.

NOTE 1 A reference data item is often an instance of **class**, but can be an instance of another type of **abstract object**, or of **possible individual**.

NOTE 2 A reference data item can be an instance of a template as defined in ISO/TS 15926-7, because a template is an instance of class of relationship which is defined in ISO/IEC 15026-2.

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4.2 A reference data library

The organization that maintains the reference data library shall specify:

— the reference data items that are within the reference data library;

— the statements about the reference data items that are within the reference data library;

— the status of each reference data item and statement within the reference data library;

— the status of each set of reference data items and each set of statements within the reference data library.

The reference data items and statements within a reference data library may be added to. The status of each reference data item or statement may be changed.

NOTE 1 This part of ISO 15926 specifies the minimum information that shall be held about a reference data item.

NOTE 2 To help the use and maintenance of a reference data library, a maintenance organization can:

— define subsets of the reference data items, where the subsets can consist of items relevant to an particular engineering discipline, or with a particular status;

— define subsets of the statements about reference data items, where the subsets can consist of statements about a particular reference data item, about a particular subset of reference data items, or with a particular status.

NOTE 3 Both reference data items and statements about reference data items are "administered items", where the term is as defined in ISO/IEC 11179-1.

4.3 Version of a reference data library

A version of a reference data library is:

— a set of reference data items from within the reference data library;

— a set of statements from within the reference data library.

4.4 Minimum information about a reference data item

A maintenance organization shall not steward a reference data item as "released", unless the reference data library contains a statement or statements that specify:

— a unique non-person-interpretable identifier for the reference data item, as defined in 5.2;

— a unique person-interpretable identifier for the reference data item, as defined in 5.3;

— a URI for the reference data item, as defined in 5.4;

— a definition that is either:

  — a text definition, as defined in 6.2;

  — a formal definition using set theory relationship, as defined in 7.2;

— at least one classification as a member of a class that is an entity in ISO 15926-2 for each reference data item, as defined in 7.1;

— if the reference data item is a class, a superclass that is already within the reference data library, as defined in 7.1.

The unique non-person-interpretable and person-interpretable identifiers shall be assigned by the maintenance organization.

NOTE The URI need not be assigned by the maintenance organization. If a URI is assigned to the reference data item by a source which can be normatively referenced, then that URI can be used.

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4.5 Minimum information about a version of a reference data library

A maintenance organization shall not steward a version of a reference data library as "released", unless each reference data item and statement within the version has the status released.

NOTE During the life of a reference data library, a reference data item or statement can have its status changed from "released" to "withdrawn". When this happens, the status of a version of a reference data library that contains the reference data item is changed to "withdrawn".

A maintenance organization shall not steward a version of a reference data library as "released", unless the reference data library contains a statement that specifies a URI for the version of the reference data library, as defined in 8.3.

EXAMPLE The version of the reference data library defined by the first edition of this part of ISO 15926 is identified by the URI:

http://standards.iso.org/iso/15926/-6/tech/reference-data-library/v-1

5 Reference data item identification

5.1 Types of reference data item identification

The reference data item identification shall consist of:

— a single non-person-interpretable identifier, as specified in 5.2;

— a single person-interpretable identifier, as specified in 5.3;

— one or more URIs, as specified in 5.4;

— any number of alternative reference data item designations, as specified in 5.5.

NOTE 1 Both the non-person-interpretable and the person-interpretable identifiers are unique within the scope of a reference data library, as required by ISO/IEC 11179-6.

NOTE 2 This part of ISO 15926 does not specify the purposes for which an identifier of a reference data item is used outside the reference data library.

NOTE 3 If an identifier is intended to be read by a person, the person-interpretable identifier should be used because this is usually more memorable.

EXAMPLE Within ISO/TS 15926-4, the class centrifugal pump is identified by the person-interpretable identifier "centrifugal pump" and by the non-person-interpretable identifier "7436". The person-interpretable identifier is more memorable.

NOTE 4 The appropriate person-interpretable identifier for a reference data item may not be known when it is first identified by the maintaining organization for the reference data library. Hence initially a reference data item may be identified only by its non-person-interpretable identifier.

5.2 Reference data item non-person-interpretable identification

A non-person-interpretable identifier shall be unique within the reference data library.

The non-person-interpretable identifier shall be allocated by the organization that maintains the reference data library. Information about the reference data item shall not be encoded in a non-person-interpretable identifier.

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In a representation of a reference data library in accordance with ISO 15926-2, a non-person-interpretable identifier is represented by an instance of **reference data item non-person-interpretable identification** (subclass of ISO 15926 entity **class of identification**).

NOTE 1 The non-person-interpretable identifier for a reference data item can be represented in a spreadsheet in the column "non-person-interpretable identifier" as shown in the spreadsheet referenced by Annex D.

The characters used in a non-person-interpretable identifier shall be those valid for a URN Namespace Specific String, as defined in IETF RFC 2141.

NOTE 2 The valid characters within a non-person-interpretable identifier are:

— numbers "0" to "9";

— the 26 lowercase letters "a" to "z";

— the 26 uppercase letters "A" to "Z";

— the special characters "(", ")", "+", ",", "-", ".", "":, "=", "@", "";, "$", "_", "!", "*", "'";

— an octet of the form "%" <hex> <hex> .

NOTE 3 The non-person-interpretable identifier can be an internal database key used by the organization that maintains a reference data library.

5.3 Reference data item person-interpretable identification

In a representation of a reference data library in accordance with ISO 15926-2, a person-interpretable identifier is represented by an instance of **reference data item person-interpretable identification** (subclass of ISO 15926 entity **class of identification**).

NOTE 1 Computer interpretable references to reference data items are usually made by URI. Person interpretable references are usually made by person-interpretable identifier. The person-interpretable identifier for a reference data item is not necessarily unique across multiple reference data libraries. Hence it is recommended that person interpretable references specify the library as well as the person-interpretable identifier.

NOTE 2 The person-interpretable identifier for a reference data item can be represented in a spreadsheet in the column "person-interpretable identifier" as shown in the spreadsheet referenced by Annex D.

The requirements for a reference data item person-interpretable identifier are as follows:

— Within a reference data library, each person-interpretable identifier shall identify exactly one reference data item.

— Within a reference data library, no two person-interpretable identifiers shall differ solely by case.

NOTE 3 This requirement ensures that two person-interpretable identifiers remain different even if both are converted into all upper case or all lower case.

NOTE 4 The case that is specified for a person-interpretable identifier is the preferred case and shall be used to construct a URI which is case sensitive.

— Within a reference data library, one person-interpretable identifier shall not be the natural language plural of another.

— The characters used in a person-interpretable identifier shall be those valid for a URN Namespace Specific String, as defined in IETF RFC 2141, with the addition of blank, and with the exception of underscore.

NOTE 5 The valid characters within a person-interpretable identifier are:

— numbers "0" to "9";

— the 26 lowercase letters "a" to "z";

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— the 26 uppercase letters “A” to “Z”;

— the special characters “(”, “)”, “+”, “,”, “-“, “.”, “”:, “=”, “@”, “”;, “$”, “ ”, “!”, “*”, “‘”;

— an octet of the form “%” <hex> <hex> .

NOTE 6 Where a person-interpretable identifier is used to construct a URI, blank is replaced by underscore, as specified in 5.4.

— If a reference data item is commonly identified by a natural language word or phrase, then that word or phrase shall be used as the person-interpretable identifier.

NOTE 7 An English word or phrase is usually preferred, but a non-English word or phrase may be chosen as the person-interpretable identifier where it is considered to be more expressive than the English, or where the non-English word or phrase is used more widely.

5.4 Reference data item identification by URI

A published reference data library item shall be identified by one or more URIs, where a URI is as defined in IETF RFC 2141. If a reference data item is defined in a normatively reference source and is assigned a URI by that source, then an additional URI is optional.

NOTE 1 The source URI is usually preferred because it is already in use.

A URI that identifies a reference data item shall not be used to identify anything else.

NOTE 2 The used of URIs is discussed in “*Cool URIs don’t change*”[13].

If a URI is not assigned in a normatively referenced source, then at least one URI shall be assigned by the maintenance organization for the reference data library. An assigned URI shall be derived from the non-person-interpretable identifier or from the person-interpretable identifier.

NOTE 3 When a proprietary RDL is submitted for standardization, the standardization body will assign its own URIs.

A URI assigned by the maintenance organization shall consist of:

— a prefix allocated to the organization that maintains the reference data library;

— a suffix that is either the non-person-interpretable identifier or the person-interpretable identifier, with any blank replaced by underscore.

NOTE 4 The prefix is the leading characters of the URI that are common to each URI assigned to reference data items in a reference data library. For a URN, the leading characters include, but are not restricted to the URN prefix that is registered to an organization. For an HTTP URI, the leading characters include, but are not restricted to, an HTTP domain.

If a URI contains a fragment identifier, then the suffix shall be the fragment identifier.

The URIs that are assigned to a reference data item shall be stated explicitly.

If a URI is derived from a person-interpretable identifier, then the case shall be that specified for the person-interpretable identifier.

NOTE 5 URIs are case sensitive.

NOTE 6 Some implementation methods can require a particular form of URI. For example, ISO/TS 15926-7 requires the use of an HTTP URI.

In a representation of a reference data library in accordance with ISO 15926-2, an identification by URI is represented by an instance of **reference data item identification by URI** (subclass of ISO 15926 entity **class of identification**), which has subclasses as follows:

— **reference data item identification by URN**;

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— **reference data item identification by HTTP URI without fragment ID**;

— **reference data item identification by HTTP URI with fragment ID**.

NOTE 7 The URIs for a reference data item can be represented in a spreadsheet in the columns "URI 1", "URI 2" or "URI 3" as shown in the spreadsheet referenced by Annex D.

NOTE 8 A possible URI scheme for a standard ISO 15926 reference data library is contained in Annex H.

5.5 Alternative reference data item designations for use in natural language text

In a representation of a reference data library in accordance with ISO 15926-2, an alternative reference data item designation is represented by an instance of **reference data item alternative person-interpretable identifier** (subclass of ISO 15926 entity **class of identification**).

An alternative designation shall not be used to make a computer interpretable reference to a reference data item.

NOTE 1 A reference data item can have any number of alternative reference data item designations for use in natural language text.

NOTE 2 If an alternative designation is used within a context, such as a language, community, or class of activity, then it is recommended that the context be stated.

NOTE 3 The same text can be an alternative designation for more than one reference data item. It is recommended that an alternative designation be unique within a context.

NOTE 4 Alternative reference data item designation cannot be used to make a computer interpretable reference because it can identify more than one item within a reference data library, and because no computer interpretable mechanism is provided to link an alternative designation to a context.

NOTE 5 Two or more designations of the same reference data item, which are words or phrases within the same language, are synonyms. Two alternative designations can be synonyms. Also an alternative designation and a reference data item person-interpretable identifier can be synonyms.

NOTE 6 Alternative reference data item designations can be represented in a spreadsheet in the columns "synonym 1" or "synonym 2" as shown in the spreadsheet referenced by Annex D.

5.6 Proprietary reference data libraries

The requirement for uniqueness of a reference data item person-interpretable identifier within a reference data library, stated in 5.3, shall be imposed by the organization that maintains the reference data library.

NOTE 1 There may be a family of reference data libraries which are used together, but which do not have a single maintaining organization.

NOTE 2 ISO/TS 15926-4 defines a core reference data library for process plant. A manufacturer or supplier company can extend this core, with a reference data library which classes specific to items supplied by the company. Different companies can act independently, and each company can be the maintaining organization for its own reference data library.

NOTE 3 The URI methodology ensures that the URI for a reference data item is unique across multiple reference data libraries.

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6 Text about a reference data item

6.1 Types of text about a reference data item

Text about a reference data item shall be as follows.

— Text definition: If a reference data item has a formal definition as defined in 7.2, then a reference data item shall not have a text definition. If a reference data item does not have a formal definition as defined in 7.2, then a reference data item shall have a single text definition as defined in 6.2.

— Note: There can be any number of notes about a reference data item as described in 6.6.

— Example: There can be any number of descriptions of examples of a reference data item that is a class as described in 6.6.

— Translated definition: There can be any number of translated definitions of a reference data item as described in 6.7.

6.2 Reference data item text definition

6.2.1 Content of a reference data item text definition

In a standard, a reference data item text definition shall be normative. A reference data item text definition shall be either:

— a reference data item text definition by explicit text, as defined in 6.4; or

— a reference data item text definition by document reference, as defined in 6.5.

A set of reference documents shall be defined for a reference data library. If a text definition can be found within the set of reference documents, then a reference data item text definition by document reference shall be used, as defined in 6.5. If a text definition cannot be found in the set of reference documents, then a reference data item text definition by explicit text shall be used, as defined in 6.4.

For a standard reference data library, the set of reference documents is the set of document to which a normative reference can be made.

6.2.2 Prioritization of sources

A text definition for a reference data item shall be sought from the following types of source document outside the reference data library, prioritised in the order of the following list:

— set of reference documents for the reference data library;

NOTE 1 This set of documents defines the terms commonly used by the community for which the reference data library is defined.

— Oxford English Dictionary;

— ISO and IEC standards;

— other international or national standards;

EXAMPLE 1 Standards published by CEN or CENELEC.

EXAMPLE 2 Standards published by ANSI or DIN.

— standards defined by industry bodies;

EXAMPLE 3 Standards published by the American Petroleum Institute (API) or NORSOK.

— other published documents used within industry.

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NOTE 2 This set of documents includes publications by professional societies and industry groups that do not seek formal standardization, such as Society of Manufacturing Engineers (SME) and Association for Operations Management (APICS).

EXAMPLE 4 A widely used academic text book.

EXAMPLE 5 A widely used glossary published by a commercial organization.

6.2.3 Requirements for a reference data item text definition

The requirements for a reference data item text definition are as follows:

— A reference data item text definition shall not contain information that is not part of the definition.

EXAMPLE 1 Information about the usual material of construction of a class of equipment item shall not be included unless this is part of the definition.

EXAMPLE 2 Information about the usual use of a class of equipment item shall not be included unless this is part of the definition.

NOTE 1 Additional information can be included as notes.

— A reference data item text definition shall not contain a complete definition of another reference data item in the same reference data library, but shall instead make reference using its person-interpretable identifier.

— A reference data item text definition shall make reference to other reference data items in accordance with 6.4.

— A reference data item text definition text shall be stated as a descriptive phrase, clause, or one or more sentences with equations and figures as necessary.

— Except where a reference data item can be formally defined in terms of a recursion, a reference data item text definition shall not refer to the reference data item that it defines.

NOTE 2 A reference data item is a not a term. Hence the reference data item person-interpretable identifier can be used in the definition of a reference data item. If this is done, it shall be made clear that the words are understood according to their natural language meaning.

Hence if the OED definition of the word pump was equivalent to the ISO/TS 15926-4 class **pump**, then the class with the reference data item person-interpretable identifier "pump" could be defined as follows:

"**physical object** that is a pump (with the first meaning defined in the OED)".

In many cases the reference data item person-interpretable identifier for a chemical or a drug is the complete and unambiguous definition of the reference data item. The following text can be both the reference data item person-interpretable identifier and the text definition of a reference data item:

"N-(1-NAPTHYL)-ETHYLENEDIAMINE DIHYDROCHLORIDE".

— A reference data item text definition that specifies a physical quantity shall be formulated in accordance with ISO 80000-1.

— A reference data item text definition taken from a source which cannot be normatively referenced shall have the standard form defined in 6.4.2.

6.2.4 Use of a reference data item person-interpretable identifier in a text definition

Within a reference data item text definition, reference to a reference data item shall be made by the reference data item person-interpretable identifier, or by any other designation of the reference data item with a URI of the reference data item given in parentheses.

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