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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/Z 18975.12-2023

**Industrial automation systems and integration - Integration of life-cycle data for
process plants including oil and gas production facilities - Part 12: Life-cycle
integration ontology represented in Web Ontology Language(OWL)**

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is GB/T (Z) 18975 "Industrial automation systems and integrated process plants (including oil and gas production facilities) life cycle"

Part 12 of "Data Integration". GB/T (Z) 18975 has released the following parts.

- Part 1. Overview and basic principles;
- Part 2. Data Model;
- Part 4. Initial reference data;
- Part 10. Compliance testing;
- Part 12. Lifecycle integration ontology represented by Web Ontology Language (OWL);
- Part 13. Integrated asset planning life cycle.

This document is equivalent to ISO /T S15926-12:2018 "Industrial automation systems and integrated process plants (including oil and gas production)"

Production Facilities) Lifecycle Data Integration Part 12. Lifecycle Integration Ontology Represented in the Web Ontology Language (OWL). file type

The technical specifications of ISO were adjusted to my country's national standardization guiding technical documents.

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

Introduction

ISO 15926 is a series of standards for process industry life cycle data integration. Its

purpose is to provide a common language for computer systems to

Achieve interoperability. The GB/T (Z) 18975 series adopts the ISO 15926 series. Each part number corresponds to the technical

The differences are explained in the preface of each section. GB/T (Z) 18975 "Industrial automation systems and integrated process plants (including oil and gas production equipment)

"Implementation) Life Cycle Data Integration" is planned to consist of the following parts.

---Part 1. Overview and basic principles. The purpose is to describe the scope and functions of GB/T (Z) 18975 and its basic principles.

---Part 2. Data Model. The purpose is to define a conceptual number for computer representation of process plant life cycle technical information.

data model.

---Part 3. Geometric and topological reference data. The purpose is to specify the geometry and topology data that can be recorded using Part 2.

Ho and topology concepts.

---Part 4. Initial reference data. The purpose is to provide an initial set of core reference data items for a process factory.

---Part 6. Reference data development and verification methods. The purpose is to provide a method for managing process plant reference data.

---Part 7. Distributed system integration implementation method. template method. The purpose is to provide a method based on the data model in Part 2

Template method for row data integration.

---Part 8. Distributed system integration implementation method. Network Ontology Language (OWL) implementation. The purpose is to provide for the use of Part 7

Includes specifications for data integration with RDF and OWL.

---Part 10. Compliance testing. The purpose is to describe the compliance with each part of GB/T (Z) 18975.

---Part 11. Simplified industrial use of reference data. The purpose is to use RDFS (Resource Description Framework schema, RDF

Schema) defines a simplified way of using reference data in the process industry.

---Part 12. Lifecycle integration ontology represented by Web Ontology Language (OWL). The purpose is to specify the use of OWL representation

An ontology that integrates process plant industrial data throughout its entire life cycle.

---Part 13.Integrated asset planning life cycle. The purpose is to provide a process plant asset planning ontology and derivatives from this ontology

An XMLschema (XML schema) for asset planning data exchange.

This document handles English technical words in the following manner.

---In order to maintain the original meaning of English and facilitate understanding of the meaning of the word, English words with entity meaning are used in this document as

When the title appears, use the Chinese translation. In the main text, the English translation is used. The first time it appears or when necessary, the Chinese translation is enclosed in brackets.

After English.

---For the computer languages such as OWL and RDF that are supported by this document and words that are only applicable in the context of English references, this document

Chinese translations are not listed.

This document is a supplement to ISO /T S15926-8.

---ISO /T S15926-8 is a direct conversion of ISO 15926-2 to OWL, in which all relationships are specified. ISO /

TS15926-8 is for the OWL implementation of template methods defined in ISO /T S15926-7.

---This document is the implementation of ISO 15926-2 in OWL, where relationships refer to object attributes, data type attributes or annotation attributes.

sex. This document defines an ontology for use with standard RDF and OWL tools.

Ontology has an OWL DL branch that can support

reasoning.

Industrial automation systems and integrated process plants (including

Oil and gas production facilities) life cycle data integration

Part 12.Represented in Web Ontology Language (OWL)

lifecycle integration ontology

1 Scope

This document specifies an ontology for the integration of industrial data throughout its life cycle. This ontology is represented using OWL.

Note 1. This ontology implements the functions of the ISO 15926-2 life cycle integration model.

Note 2. OWL has a representation in RDF. Therefore, this document provides the functionality to query lifecycle integration data using SPARQL.

This document applies to.

- Basic subcategories of individuals existing in the actual world or possible worlds, including physical objects, activities and events;
- The relationship between physical objects, activities and events, including the creation and retirement of physical objects;
- Whole-part relationships between physical objects, including time-part relationships implementing 4D methods that change over time;
- Time and period;
- Spatial points and spatial domains;
- The time identified by a text string in the format specified by ISO 8601.

This document does not apply to.

- Definition of physical quantities and measurement scales;
- Knowledge organization and document metadata specifications;
- Approval and status;
- Geometry and topology, including shapes.

Note 3. Geometry and topology are covered by ISO /T S15926-3.

2 Normative reference documents

This document has no normative references.

3.1 Terms and definitions

The following terms and definitions apply to this document.

3.1.1

activity activity

Something happening or changing (3.1.5).

3.1.2

event event