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Data quality —

Part 150: Master data: Quality management framework

Qualité des données —

Partie 150: Données permanentes: Cadre de management de la qualité

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50% of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

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An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

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/TS 8000-150 was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4, *Industrial data*.

ISO 8000 is organized as a series of parts, each published separately. The structure of ISO 8000 is described in ISO 8000-1.

Each part of ISO 8000 is a member of one of the following series: general data quality, master data quality, transactional data quality and product data quality. This part of ISO 8000 is a member of the master data quality series.

A complete list of parts of ISO 8000 is available from the Internet:

`http://www.tc184-sc4.org/titles/DATA_QUALITY_Titles.htm`

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Introduction

The ability to create, collect, store, maintain, transfer, process and present data to support business processes in a timely and cost effective manner requires both an understanding of the characteristics of the data that determine its quality, and an ability to measure, manage and report on data quality.

ISO 8000 defines characteristics that can be tested by any organization in the data supply chain to objectively determine conformance of the data to ISO 8000.

ISO 8000 provides a framework for improving data quality that can be used independently or in conjunction with quality management systems.

There is a limit to master data quality improvement with the data-centric approach where only the data found defective is corrected. When data errors and their related data are traced and corrected, or root causes of data errors are removed through processes for data quality management, recurrence of the same data errors can be prevented. Therefore, a framework for process-centric data quality management is required to improve data quality.

For this purpose, this part of ISO 8000 specifies fundamental principles of a master data quality management, and requirements for implementation, data exchange and provenance. This standard also contains an informative framework that identifies processes for data quality management. For reader's better understanding, the framework in detail, its functional model and a business scenario with examples are provided in Annexes B, C and D, respectively. This framework can be used in conjunction with or independently of quality management systems standards, for example, ISO 9001.

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This part of ISO 8000 is intended for use by organizations that have multiple systems that share master data and/or that share and exchange data with other organizations and therefore need to manage the quality of their master data.

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Although the framework has been developed based on the experience of data quality management applied in industries such as finance, telecommunication, and public institutions, it is expected that this framework, with appropriate extension, can also be applied to mechanical design or manufacturing data.

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Data quality —

Part 150:
Master data: Quality management framework

1 Scope

This part of ISO 8000 provides fundamental principles of a process-centred approach to master data quality management and requirements that can be used by an organization to implement master data quality management. It also contains an informative framework that identifies processes for master data quality management. This part of ISO 8000 can be used in conjunction with or independently of quality management systems standards, for example, ISO 9001.

The following are within the scope of this part of ISO 8000:

— fundamental principles of master data quality management;

— requirements

  — implementation requirements;

  — data exchange requirements;

  — provenance requirements;

— master data quality management framework

  — top-level and lower level processes;

  — roles.

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The following are outside the scope of this part of ISO 8000:

— data quality evaluation and certification methods;

— taxonomy of data;

— data quality maturity model.

This part of ISO 8000 is intended for use by organizations that have multiple systems that share master data and/or that share and exchange data with other organizations and therefore need to manage the quality of their master data.

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.

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ISO 8000-2, *Data quality — Part 2: Vocabulary*

ISO 8000-110, *Data quality — Part 110: Master data: Exchange of characteristic data: Syntax, semantic encoding, and conformance to data specification*

ISO/TS 8000-120, *Data quality — Part 120: Master data: Exchange of characteristic data: Provenance*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8000-2 apply.

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

UNSPSC United Nations standard products and services code

GTIN global trade item number

SQL structured query language

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4 Fundamental principles of master data quality management

To manage master data quality successfully, organizations shall keep the following fundamental principles.

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— Involvement of people: people at all levels who have roles for data quality management are involved to improve data quality of an organization. Although data processing of end users with lower-level role has the most direct effect on data quality, intervention or control of data administrators with middle-level role is required to implement and settle down processes for data quality improvement in the organization. In addition, involvement of managers who are in charge of organization-wide data quality with high-level role is inevitable to change and optimize roles, authority, and processes of the organization.

— Process approach: data-centric measurement and correction is not enough to improve data quality of the whole organization. Desired data quality is achieved more efficiently when activities and related resources for data quality are managed by processes.

— Continual improvement: data quality is improved continuously through the processes of data processing, data quality measurement and data error correction. However, with these processes only, identical data errors that occur repeatedly cannot be prevented. Recurrence of data errors can be prevented when the processes to analyze, trace and improve root causes which hinder data quality goes with these processes. For this, management processes concerned with data architecture/schema, data stewardship and data flow shall also be supported. In addition, organizations shall improve not only processes for data quality management but also business processes where data are directly operated.

— Master data exchange: all processes to manage master data quality comply with requirements that can be checked by computer for the exchange, between organizations and systems, of master data that consists of characteristic data.

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The framework of master data quality management, the functional model of the framework and a business scenario with examples are provided as informative in Annexes C, D and E, respectively.

5 Requirements

5.1 Implementation requirements

An organization that implements this part of ISO 8000 shall perform the following actions:

— perform processes for data quality management that include at least data processing, data quality measurement and correction, data schema design, measurement criteria setup, error cause analysis, data quality planning and data architecture/stewardship/flow management;

— assign roles for data quality management within their organization;

NOTE 1 Each role can be assigned to multiple persons, or multiple roles assigned to one person or position. The roles assigned can be one of many other roles assigned to a person or position.

— embed processes for data quality management within the organizations business processes.

NOTE 2 The processes defined can be embedded at multiple places within the business processes of organizations, specifically anywhere master data is created and used.

5.2 Data exchange requirements

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An organization shall:

— be capable of sending and receiving master data messages that conform to ISO 8000-110;

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— specify a data dictionary to be used for semantic coding of master data messages sent to and from external organizations. The data dictionary shall meet the requirements of ISO 8000-110 for use in semantic coding;

— maintain a registry of data specifications that document the organization's data requirements for master data messages.

All master data messages that the organization sends to external organizations shall conform to ISO 8000-110.

The organization shall require that all master data messages sent to it conform to ISO 8000-110.

A data supplier claiming conformance to this part of ISO 8000 shall maintain a suitable electronic means for receiving queries for master data.

EXAMPLE An email address is published on the company's website or in a registry maintained by a third party.

5.3 Provenance requirements

This clause contains requirements that are optional for data exchange in addition to those in 5.2.

Any master data message that the organization sends to external organizations shall conform to ISO/TS 8000-120.

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6 Conformance

An organization conforms to this part of ISO 8000 when it can present documentary evidence of the following:

— Roles for data quality management are assigned within their organization.

EXAMPLE 1 A job description is documentary evidence of a role assignment.

— Processes for data quality management are incorporated within the organizations business processes.

EXAMPLE 2 A business process model that includes the processes at appropriate places would be evidence of incorporation.

— The processes for data quality management are being executed.

EXAMPLE 3 Specifications of master data quality requirements, results of master data quality measurements, a log of defects and non-conformance, and a log of root cause analysis and corrective actions are evidence of the business processes being executed.

This part of ISO 8000 also provides for a number of options that may be supported by an implementation. These options have been grouped into the following conformance classes:

— free decoding;

— fee-based decoding;

— free decoding with provenance;

— fee-based decoding with provenance.

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Conformance to the free decoding conformance class requires:

— the data dictionary, data specifications, and any incoming or outgoing master data messages conform to the free decoding conformance class of ISO 8000-110;

— all requirements of 5.2 are met.

In addition to the above, conformance to the free decoding with provenance conformance class requires that all requirements of 5.3 are met.

Conformance to the fee-based decoding conformance class requires:

— the data dictionary, data specifications, and any incoming or outgoing master data messages conform to the fee-based decoding conformance class of ISO 8000-110;

— all requirements of 5.2 are met.

In addition to the above, conformance to the fee-based decoding with provenance conformance class requires that all requirements of 5.3 are met.

Any claim of conformance to this part of ISO 8000 that does not explicitly state the conformance class shall be a claim of conformance to one of the free decoding conformance classes.

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Annex A
(normative)

Document identification

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

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{ iso standard 8000 part(150) version(1) }
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is assigned to this part of ISO 8000. The meaning of this value is defined in ISO/IEC 8824-1, and is described in ISO 10303-1.

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Annex B
(informative)

Master data quality management framework

B.1 Overview of the master data quality management framework

The structure of the framework is graphically represented in a 3x3 matrix as shown in Figure B.1. The framework consists of three top-level processes: data operations, data quality monitoring, and data quality improvement. Each top-level process is segmented into three processes by the role of the person performing the process. The processes are related to one another according to the order of processes and input/output of data.

Processes grouped under the role of data manager support those under the role of a data administrator. The process of data architecture management presents the guidelines necessary to design data structures. The process of data stewardship and flow management provides the necessary information to analyze error causes and the process of data quality plan offers objectives or guidelines for data quality that assist in setting up criteria.

Processes grouped under the role of data administrator are comprised of the followings: data design, data quality criteria setup, and data error cause analysis. These three processes control and coordinate data so as to support processes under the role of data technician. The process data design helps to ensure data operation quality by improving data schema. The process, data quality criteria setup provides with criteria and methodologies to assess data quality. The process of data error cause analysis prevents recurrence of the same data errors by analyzing root causes of the data errors.

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Processes grouped under the role of data technician are split into the followings: data processing, data quality measurement, and data error correction. The three processes are performed successively: first, the process of data processing that creates, reads, modifies, transfers, and deletes data is implemented in accordance with data guidelines. In order to find unnoted data errors during the process, the process of data quality measurement is executed on a real time basis or periodically. In case that data errors are found in the process, the process of data error correction enters the execution mode.

Thus far, processes were explained in the order of data manager, data administrator and data technician. However, in certain cases results of the processes are fed back in reverse order.

Generally the data quality policy is consistent with the overall information technology (IT) policy of the organization and provides a basis for the setting of data quality objectives. Therefore, the data quality policy is considered one of control factors which affect the performance of the whole framework.

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