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Data quality —

Part 51:
Data governance: Exchange of data policy statements

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 4 *Industrial data*.

A list of all parts in the ISO 8000 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

0.1 Foundations of the ISO 8000 series

Digital data deliver value by enhancing all aspects of organizational performance including:

- operational effectiveness and efficiency;
- safety and security;
- reputation with customers and the wider public;
- compliance with statutory regulations;
- innovation;
- consumer costs, revenues and stock prices.

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In addition, many organizations are now addressing these considerations with reference to the United Nations Sustainable Development Goals¹.

The influence on performance originates from data being the formalized representation of information². This information enables organizations to make reliable decisions. This decision making can be performed by human beings directly and also by automated data processing including artificial intelligence systems.

Through widespread adoption of digital computing and associated communication technologies, organizations become dependent on digital data. This dependency amplifies the negative consequences of lack of quality in these data. These consequences are the decrease of organizational performance.

The biggest impact of digital data comes from two key factors:

- the data having a structure that reflects the nature of the subject matter;

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EXAMPLE 1 A research scientist writes a report using a software application for word processing. This report includes a table that uses a clear, logical layout to show results from an experiment. These results indicate how material properties vary with temperature. The report is read by a designer, who uses the results to create a product that works in a range of different operating temperatures.

- the data being computer processable (machine readable) rather than just being for a person to read and understand.

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EXAMPLE 2 A research scientist uses a database system to store the results of experiments on a material. This system controls the format of different values in the data set. The system generates an output file of digital data. This file is processed by a software application for engineering analysis. The application determines the optimum geometry when using the material to make a product.

ISO 9000 explains that quality is not an abstract concept of absolute perfection. Quality is actually the conformance of characteristics to requirements. This actuality means that any item of data can be of high quality for one purpose but not for a different purpose. The quality is different because the requirements are different between the two purposes.

EXAMPLE 3 Time data are processed by calendar applications and also by control systems for propulsion units on spacecraft. These data include start times for meetings in a calendar application and activation times in a control system. These start times require less precision than the activation times.

The nature of digital data is fundamental to establishing requirements that are relevant to the specific decisions that are made by each organization.

¹ <https://sdgs.un.org/goals>

² ISO 8000-2 defines information as “knowledge concerning objects, such as facts, events, things, processes, or ideas, including concepts, that within a certain context has a particular meaning”.

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EXAMPLE 4 ISO 8000-1 identifies that data have syntactic (format), semantic (meaning) and pragmatic (usefulness) characteristics.

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To support the delivery of high-quality data, the ISO 8000 series addresses:

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- data governance, data quality management and maturity assessment;

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EXAMPLE 5 ISO 8000-61 specifies a process reference model for data quality management.

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- creating and applying requirements for data and information;

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EXAMPLE 6 ISO 8000-110 specifies how to exchange characteristic data that are master data.

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- monitoring and measuring information and data quality;

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EXAMPLE 7 ISO 8000-8 specifies approaches to measuring information and data quality.

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- improving data and, consequently, information quality;

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EXAMPLE 8 ISO/TS 8000-81 specifies an approach to data profiling, which identifies opportunities to improve data quality.

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- issues that are specific to the type of content in a data set.

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EXAMPLE 9 ISO/TS 8000-311 specifies how to address quality considerations for product shape data.

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Data quality management covers all aspects of data processing, including creating, collecting, storing, maintaining, transferring, exploiting and presenting data to deliver information.

Effective data quality management is systemic and systematic, requiring an understanding of the root causes of data quality issues. This understanding is the basis for not just correcting existing nonconformities but for also implementing solutions that prevent future recurrence of those nonconformities.

EXAMPLE 10 If a data set includes dates in multiple formats including “yyyy-mm-dd”, “mm-dd-yy” and “dd-mm-yy”, then data cleansing can correct the consistency of the values. Such cleansing requires additional information, however, to resolve ambiguous entries (such as, “04-05-20”). The cleansing also cannot address any process issues and people issues, including training, that have caused the inconsistency.

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0.2 Understanding more about the ISO 8000 series

ISO 8000-1 provides a detailed explanation of the structure and scope of the whole ISO 8000 series.

ISO 8000-2³ specifies the single, common vocabulary for the ISO 8000 series. This vocabulary is ideal reading material by which to understand the overall subject matter of data quality. ISO 8000-2 presents the vocabulary structured by a series of topic areas (for example, terms relating to quality and terms relating to data and information).

ISO has identified ISO 8000-1, ISO 8000-2 and ISO 8000-8 as horizontal deliverables⁴.

0.3 Role of this document

As a contribution to this overall capability of the ISO 8000 series, this document enables organizations to exchange data policy statements. These statements are the core output from data governance. This output supports organizations to achieve availability, usability, integrity and security of data. The policies affect the practical implementation of creating, managing and using data sets.

An organization appoints a data governance authority to be responsible for developing and enforcing the policies relating to the management of data.

To ensure the effect of these policies, organizations can decide each data governance policy statement:

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³ The content is available on the ISO Online Browsing Platform. <https://www.iso.org/obp>.

⁴ Deliverable dealing with a subject relevant to a number of committees or sectors or of crucial importance to ensure coherence across standardization deliverables.

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- a) is recorded by a data governance policy register (see Annex B);
- b) has a reference;
- c) specifies the requirements applicable to a data set in a specification that conforms with ISO/TS 22745-30;
- d) identifies the domain of application;
- e) describes how to measure and monitor conformance with the requirements specified by the policy

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Software applications are available to assist organizations in the creation and management of data governance policies. These organizations can significantly reduce the cost of implementing data governance by creating data governance policy statements that are portable. Such statements can be reliably interpreted by multiple applications, contributing to improved data and information quality.

Organizations can use this document on its own or in conjunction with other parts in the ISO 8000 series.

This document supports activities that affect:

- one or more information systems;
- data flows within the organization and with external organizations;
- any phase of the data life cycle.

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Annex A of this document contains an identifier that conforms to ISO/IEC 8824-1. The identifier unambiguously identifies this document in an open information system.

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0.4 Benefits of the ISO 8000 series

By implementing parts in the ISO 8000 series to improve organizational performance, an organization achieves the following benefits:

- objective validation of the foundations for digital transformation of the organization;
- a sustainable basis for data in digital form becoming a fundamental asset class the organization relies on to deliver value;
- securing evidence-based trust from other parties (including supply chain partners and regulators) about the repeatability and reliability of data and information processing in the organization;
- portability of data with resulting protection against loss of intellectual property and reusability across the organization and applications;
- effective and efficient interoperability between all parties in a supply chain to achieve traceability of data back to original sources;
- readiness to acquire or supply services where the other party expects to work with common understanding of explicit data requirements.

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Data quality —

Part 51: Data governance: Exchange of data policy statements

1 Scope

This document specifies requirements that support the exchange of data governance policy statements and automated conformance testing of data sets to the data specifications referenced by policy statements.

The following are within the scope of this document:

- requirements for the syntax and semantics of identifiers for organizations issuing data governance policy statements;
- requirements for the syntax and semantics of identifiers for data governance policy statements;
- data specifications referenced by data governance policy statements, where those specifications are computer processable.

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The following are outside the scope of this document:

- general processes, roles and responsibilities for performing data governance;
- EXAMPLE An approach to data governance is covered by ISO/IEC 38505-1 and ISO/IEC TR 38505-2.
- requirements for the syntax and semantics of data specifications referenced by a data governance policy statement;
 - requirements for the syntax and semantics of data governance policy statements;
 - methods used for the creation of data governance policy statements;
 - methods used for measuring conformance with the requirements referenced by data governance policy statements;
 - methods used for monitoring conformance with the requirements referenced by data governance policy statements.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8000-2, *Data quality — Part 2: Vocabulary*
- ISO 8000-115, *Data quality — Part 115: Master data: Exchange of quality identifiers: Syntactic, semantic and resolution requirements*
- ISO 8000-116, *Data quality — Part 116: Master data: Exchange of quality identifiers: Application of ISO 8000-115 to authoritative legal entity identifiers*

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3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>

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— JEC Electropedia: available at <https://www.electropedia.org/>

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4 Fundamental principles and assumptions

Data governance policy statements are the means by which an organization identifies the requirements to which relevant data conforms in order to ensure the organization operates coherently with respect to strategic objectives and legal obligations. The organization has implemented a complete governance regime when, across the organization, all data is covered by one or more data governance policy statements.

EXAMPLE 1 An organization creates a data governance policy statement that identifies the applicability of the General Data Protection Regulation^[16] to data processing within the organization.

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An organization can only manage data governance effectively and efficiently when each data governance policy statement has a unique identifier. The organization can only prove conformance with the requirements identified by those statements by collecting appropriate data sets as the necessary evidence. Each data set is only valid when conforming to all applicable data specifications.

Some data governance requirements will originate with other parties. These parties can include partners across a supply chain and regulators. Such requirements are only portable between organizations and between applications if the requirements are computer processable and include only consistently interpretable semantics.

By creating computer-processable data governance policy statements, an organization is able to automate validation and reporting of testing for conformance of individual data sets with all applicable data specifications.

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EXAMPLE 2 An organization uses robotic process automation to test all data processing for compliance with the General Data Protection Regulation^[16].

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5 Requirements for representing data governance policy statements

a) A data governance policy statement shall include an authoritative legal entity identifier to identify the organization that issued the policy.

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NOTE 1 The authoritative legal entity identifier uniquely identifies the organization.

b) The authoritative legal entity identifier shall conform to ISO 8000-116.

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NOTE 2 ISO 8000-116 specifies the requirements for representing authoritative legal entity identifiers.

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c) A data governance policy statement shall be uniquely identified by an identifier that conforms to ISO 8000-115.

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NOTE 3 ISO 8000-115 specifies the requirements for the quality identifiers that form part of an exchange of master data.

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d) A data governance policy statement shall contain a reference to a computer-processable data specification that is the one to which a data set conforms, as required by the policy.

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EXAMPLE ISO 10303-242 specifies a data specification for the exchange and sharing of the data that enables model-based 3D engineering; ISO 15926-2 specifies a data specification for representation of technical information about process plants; ISO/TS 29002-10 specifies a data specification for exchange of characteristic data.

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6 Conformance

A data governance policy statement conforms to this document when [Clause 5, a\), b\), c\) and d\)](#) are met.

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EXAMPLE [Annex B](#) shows an example of how an organization can create a register of such policies.

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