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**Geoinformation –
Datenqualität –
Teil 1: Allgemeine Anforderungen (ISO 19157-1:2023);
Englische Fassung EN ISO 19157-1:2023**

Geographic information –
Data quality –
Part 1: General requirements (ISO 19157-1:2023);
English version EN ISO 19157-1:2023

Information géographique –
Qualité des données –
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Nationales Vorwort

Dieses Dokument (EN ISO 19157-1:2023) wurde vom Technischen Komitee ISO/TC 211 „Geographic information/Geomatics“ in Zusammenarbeit mit dem Technischen Komitee CEN/TC 287 „Geoinformation“ (Sekretariat BSI, Belgien) erarbeitet.

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Dieses Dokument enthält unter Berücksichtigung des DIN-Präsidialbeschlusses 1/2004 nur die Englische Fassung von EN ISO 19157-1:2023.

Für die in diesem Dokument zitierten Dokumente wird im Folgenden auf die entsprechenden deutschen Dokumente hingewiesen:

ISO 2859 (all parts)	siehe	DIN ISO 2859 (alle Teile)
ISO 3534-2:2006	siehe	DIN ISO 3534-2:2013-12
ISO 3951-1	siehe	DIN ISO 3951-1
ISO 8601-1	siehe	DIN ISO 8601-1
ISO 9000:2015	siehe	DIN EN ISO 9000:2015-11
ISO 19101-1:2014	siehe	DIN EN ISO 19101-1:2015-03
ISO 19105:2022	siehe	DIN EN ISO 19105:2022-10
ISO 19108:2002	siehe	DIN EN ISO 19108:2005-05
ISO 19109:2015	siehe	DIN EN ISO 19109:2016-05
ISO 19110:2016	siehe	DIN EN ISO 19110:2017-05
ISO 19115-1:2014	siehe	DIN EN ISO 19115-1:2014-07
ISO 19116:2019	siehe	DIN EN ISO 19116:2020-09
ISO/FDIS 19123-1:—*	siehe	DIN EN ISO 19123-1:—*
ISO 19131:2022	siehe	DIN EN ISO 19131:2023-04
ISO 19135-1:2015	siehe	DIN EN ISO 19135-1:2016-02
ISO 19156:2011	siehe	DIN EN ISO 19156:2013-10
ISO/TS 19139-1	siehe	DIN CEN ISO/TS 19139-1

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Änderungen

Gegenüber DIN EN ISO 19157:2014-04 sowie DIN EN ISO 19157/A1:2018-06 wurden folgende Änderungen vorgenommen:

- a) Aufteilung der ISO 19157 in drei Teile;
- b) allgemeine inhaltliche Überarbeitung;
- c) redaktionelle Überarbeitung.

* In Vorbereitung.

Frühere Ausgaben

DIN EN ISO 19113: 2005-05
DIN EN ISO 19114: 2005-05
DIN EN ISO 19114 Berichtigung 1: 2006-10
DIN EN ISO 19157: 2014-04
DIN EN ISO 19157/A1: 2018-06

Nationaler Anhang NA (informativ)

Begriffe und Abkürzungen

Reihenfolge und Inhalt der folgenden Begriffe sind identisch mit denen im Abschnitt Begriffe der Englischen Fassung.

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- ISO Online Browsing Platform: verfügbar unter <https://www.iso.org/obp>
- IEC Electropedia: verfügbar unter <http://www.electropedia.org/>

3.1

Genauigkeit

en **accuracy**

Grad der Übereinstimmung zwischen einem Ermittlungsergebnis oder einem Messergebnis und dem wahren Wert

Anmerkung 1 zum Begriff: In diesem Dokument kann der wahre Wert ein Bezugswert sein, der als wahr angenommen wird.

[QUELLE: ISO 3534-2:2006, 3.3.1, modifiziert – Anmerkungen 1, 2 und 3 zum Begriff wurden gelöscht. Anmerkung 1 zum Begriff wurde hinzugefügt.]

3.2

Konformität

Übereinstimmung

en **conformance**

Erfüllung einer Anforderung

Anmerkung 1 zum Begriff: Liegt keine Mehrdeutigkeit vor, so darf der Modifikator „Konformität“ entfallen, d. h. „Prüfbericht“ und „Konformitätsprüfbericht“ stimmen überein.

[QUELLE: ISO 19105:2022, 3.4]

3.3

Qualitätskonformitätsschwellwert

en **conformance quality level**

Schwellenwert oder Reihe von Schwellenwerten zur Ermittlung der *Qualität* von *Daten*, mit denen bestimmt wird, wie gut ein *Datensatz* die in dessen *Datenprodukt-Spezifikation* oder den Benutzeranforderungen festgelegten Kriterien erfüllt

3.4

Richtigkeit

en **correctness**

Übereinstimmung mit dem *Gegenstandsbereich*

3.5

Coverage

en **coverage**

Feature, das als Funktion zur Rückgabe von Werten aus seinem Wertebereich für jede direkte Position innerhalb seines Bereichs dient

[QUELLE: ISO/FDIS 19123-1:—¹, 3.1.8]

3.6

Datenprodukt-Spezifikation

en **data product specification**

Spezifikation eines Datenprodukts verbunden mit ergänzenden Informationen, die deren Erstellung, Lieferung an und Nutzung durch Dritte ermöglicht

Anmerkung 1 zum Begriff: Eine Produktspezifikation für Daten stellt eine Beschreibung des Gegenstandsbereichs sowie eine Spezifikation für die Abbildung des Diskursuniversums auf einen Datensatz bereit. Sie darf zu Produktions-, Verkaufs-, Endnutzer- und sonstigen Zwecken verwendet werden.

Anmerkung 2 zum Begriff: Eine Spezifikation ist ein Dokument mit Anforderungen (siehe ISO 9000:2015, 3.8.7).

Anmerkung 3 zum Begriff: Ein Datenprodukt ist ein Datensatz oder eine Serie von Datensätzen, die bereitgestellt werden können (siehe ISO 19131:2022, 3.8).

[QUELLE: ISO 19131:2022, 3.9 modifiziert — Anmerkung 2 und 3 zum Begriff wurden hinzugefügt]

3.7

Datenqualität

en **data quality**

Grad, in dem ein Satz inhärenter Merkmale von Daten Anforderungen erfüllt

[QUELLE: ISO 8000-2:2022, 3.8.1, modifiziert — Anmerkung 1 zum Begriff wurde gelöscht]

3.8

Maß der Datenqualität

en **data quality measure**

Variable, der als Ergebnis der Messung eines Merkmals der Datenqualität ein Wert zugewiesen wird

[QUELLE: ISO/IEC 25012:2008, 4.5, modifiziert — Anmerkung 1 zum Begriff wurde gelöscht]

3.9

Einheit der Datenqualität

en **data quality unit**

Kombination aus einem Anwendungsbereich und Datenqualitätselementen

3.10

Datensatz

en **dataset**

identifizierbare Sammlung von Daten

Anmerkung 1 zum Begriff: Ein Datensatz kann eine kleinere Gruppierung von Daten sein, die sich physikalisch innerhalb eines größeren Datensatzes befindet, auch wenn der Datensatz durch einige Einschränkungen, wie z. B. die räumliche Ausdehnung oder die Feature-Klasse, begrenzt ist. Theoretisch kann ein Datensatz so klein wie ein einzelnes Feature oder ein Feature-Attribut sein, das in einem größeren Datensatz enthalten ist. Auch eine gedruckte Karte kann als ein Datensatz angesehen werden.

1 In Vorbereitung. Stufe zum Zeitpunkt der Veröffentlichung: ISO/FDIS 19123:2023.

[QUELLE: ISO 19115-1:2014, 4.3]

3.11

Serie von Datensätzen

en **dataset series**

Sammlung von *Datensätzen* mit gemeinsamer Produktspezifikation

[QUELLE: ISO 19115-1:2014, 4.4]

3.12

Feature

en **feature**

Abstraktion eines Phänomens der realen Welt

Anmerkung 1 zum Begriff: Ein Feature kann als Typ oder Instanz vorkommen. *Feature-Klasse* oder *Feature-Instanz* werden verwendet, wenn nur eines von beiden gemeint ist.

[QUELLE: ISO 19101-1: 2014, 4.1.11]

3.13

Feature-Attribut

en **feature attribute**

Merkmal eines *Features*

Anmerkung 1 zum Begriff: Ein Feature-Attribut hat einen Namen, einen Datentyp und einen mit ihm verbundenen Wertebereich. Ein Feature-Attribut für eine *Feature-Instanz* hat außerdem einen dem Wertebereich entnommenen Attributwert.

[QUELLE: ISO 19101-1:2014, 4.1.12 modifiziert — Beispiele 1 und 2 sowie Anmerkungen 2 und 3 zum Begriff wurden gelöscht.]

3.14

Feature-Instanz

en **feature instance**

einzelne vorgegebene *Feature-Klasse* mit festgelegten Werten von *Feature-Attributen*

[QUELLE: ISO 19101-1:2014, 4.1.14]

3.15

Feature-Operation

en **feature operation**

Operation, die jede Instanz einer *Feature-Klasse* ausführen kann

[QUELLE: ISO 19110:2016, 3.7, modifiziert — Beispiele und Anmerkung 1 zum Begriff wurden entfernt.]

3.16

Feature-Klasse

Objektart

en **feature type**

Klasse von *Features* mit gemeinsamen Merkmalen

[QUELLE: ISO 19156:2011, 4.7]

3.17**geographische Daten**en **geographic data**

Daten mit einem impliziten oder expliziten Ortsbezug zur Erde

[QUELLE: ISO 19109:2015, 4.13, modifiziert — Anmerkung 1 zum Begriff wurde gelöscht.]

3.18**Element**en **item**

etwas, das einzeln beschrieben und betrachtet werden kann

Anmerkung 1 zum Begriff: Ein Element kann jeglicher Teil eines *Datensatzes* sein, zum Beispiel ein *Feature*, eine *Feature-Beziehung*, ein *Feature-Attribut* oder eine Kombination aus diesen Teilen.

[QUELLE: ISO 2859-5:2005, 3.4, modifiziert — Beispiel wurde entfernt. Anmerkung 1 zum Begriff wurde hinzugefügt.]

3.19**Abstammung**

Herkunft, Ursprung und Produktionsprozess(e), die für die Herstellung einer Ressource relevant sind

[QUELLE: ISO 19115-1:2014, 4.9]

3.20**Metadaten**en **metadata**

Information über eine Ressource

[QUELLE: ISO 19115-1:2014, 4.10]

3.21**Metaqualität**en **metaquality**Informationen, die die *Qualität* der *Datenqualität* beschreiben**3.22****Qualität**en **quality**

Grad, in dem ein Satz inhärenter Merkmale eines Objekts Anforderungen erfüllt

[QUELLE: ISO 9000:2015, 3.6.2, modifiziert — Anmerkungen 1 und 2 zum Begriff wurden entfernt.]

3.23**Qualitätsbewertung**en **quality evaluation**

systematische Prüfung, inwieweit eine Einheit in der Lage ist, vorgegebene Anforderungen zu erfüllen

[QUELLE: ISO/IEC/IEEE 24765:2017, 3.3267, modifiziert — Anmerkung 1 zum Begriff wurde entfernt.]

3.24**Register**en **register**Menge an Dateien, welche Identifikatoren und Beschreibungen zu *Einträgen* enthalten

[QUELLE: ISO 19135-1:2015, 4.1.9]

3.25

Anforderung

en **requirement**

Erfordernis oder Erwartung, das oder die festgelegt, üblicherweise vorausgesetzt oder verpflichtend ist

[QUELLE: ISO 9000:2015, 3.6.4, modifiziert — Anmerkungen 1, 2, 3, 4, 5 und 6 zum Begriff wurden entfernt.]

3.26

Qualitätsbewertungsbericht

Qualitätsbericht

en **quality evaluation report**

Freitext-Dokument, das ausführliche Informationen bezüglich der *Datenqualitätsbewertung*, den Ergebnissen und den verwendeten Bewertungskriterien bereitstellt

3.27

Unsicherheit

Messunsicherheit

en **uncertainty**

dem Messergebnis zugeordneter Parameter, der die Streuung der Werte kennzeichnet, die sinnvollerweise einer Messgröße zugeordnet werden können

Anmerkung 1 zum Begriff: Messungenauigkeit umfasst allgemein viele Komponenten. Einige dieser Komponenten können aus der statistischen Verteilung der Ergebnisse einer Messreihe ermittelt und durch empirische Standardabweichungen charakterisiert werden. Die anderen Komponenten, die ebenfalls durch Standardabweichungen charakterisiert werden können, werden aus angenommenen Wahrscheinlichkeitsverteilungen ermittelt, die sich auf Erfahrung oder andere Informationen gründen.

[QUELLE: ISO 19116:2019, 3.28, modifiziert — Anmerkung 1 zum Begriff wurde entfernt und durch Anmerkung 2 zum Begriff aus ISO 19101-2:2018, 3.40, ersetzt.]

3.28

Gegenstandsbereich

en **universe of discourse**

Sicht der realen oder hypothetischen Welt, die die Gesamtheit dessen umfasst, was für eine Anwendung von Interesse ist

[QUELLE: ISO 19101-1:2014, 4.1.38]

Nationaler Anhang NB (informativ)

Abkürzungen und Pakete

NB.1 Abkürzungen

ADQR Qualitätsergebnis der zusammengefassten Daten (en: aggregated data quality result)

AQL Annehmbare Qualitätsgrenzlage (en: acceptance quality limit)

GML Geographic Markup Language

UML Unified Modelling Language

XML erweiterbare Auszeichnungssprache (en: Extensible Markup Language)

NB.2 Paketabkürzungen

Abkürzungen werden verwendet, um das Paket zu benennen, das eine Klasse enthält. Diese Abkürzungen stehen vor den Klassennamen und sind durch ein „_“ verbunden. Eine Liste dieser Abkürzungen ist in Tabelle 1 aufgeführt. Die Internationale Norm, in der sich diese Klassen befinden, ist in Klammern angegeben.

Tabelle NB.1 — Paketabkürzungen

CI	Referenzangabe [ISO 19115-1:2014]
DS	Datensatz [ISO 19115-1:2014]
GF	Allgemeines Feature [ISO 19109:2015]
LI	Abstammung [ISO 19115-1:2014]
MD	Metadaten [ISO 19115-1:2014]

Nationaler Anhang NC (informativ)

Literaturhinweise

DIN CEN ISO/TS 19139-1, *Geoinformation — XML-Schema-Implementierung — Teil 1: Kodierungsregeln*

DIN EN ISO 9000:2015-11, *Qualitätsmanagementsysteme — Grundlagen und Begriffe (ISO 9000:2015); Deutsche und Englische Fassung EN ISO 9000:2015*

DIN EN ISO 19101-1:2015-03, *Geoinformation — Referenzmodell — Teil 1: Grundsätze (ISO 19101-1:2014); Englische Fassung EN ISO 19101-1:2014*

DIN EN ISO 19105:2022-10, *Geoinformation — Konformität und Prüfung (ISO 19105:2022); Englische Fassung EN ISO 19105:2022*

DIN EN ISO 19108:2005-05, *Geoinformation — Zeitliches Schema (ISO 19108:2002); Englische Fassung EN ISO 19108:2005*

DIN EN ISO 19109:2016-05, *Geoinformation — Regeln zur Erstellung von Anwendungsschemata (ISO 19109:2015); Englische Fassung EN ISO 19109:2015*

DIN EN ISO 19110:2017-05, *Geoinformation — Objektartenkataloge (ISO 19110:2016); Englische Fassung EN ISO 19110:2016*

DIN EN ISO 19115-1:2014-07, *Geoinformation — Metadaten — Teil 1: Grundsätze (ISO 19115-1:2014); Englische Fassung EN ISO 19115-1:2014*

DIN EN ISO 19116:2020-09, *Geoinformation — Positionierung (ISO 19116:2019); Englische Fassung EN ISO 19116:2019*

DIN EN ISO 19123-1:—, *Geoinformation — Coverage Geometrie- und Funktionsschema — Teil 1: Grundlagen*

DIN EN ISO 19131:2023-04, *Geoinformation — Produktspezifikationen für Geodaten (ISO 19131:2022); Englische Fassung EN ISO 19131:2022*

DIN EN ISO 19135-1:2016-02, *Geoinformation — Registrierungsverfahren für geographische Informationseinheiten — Teil 1: Grundsätze (ISO 19135-1:2015); Englische Fassung EN ISO 19135-1:2015*

DIN EN ISO 19156:2013-10, *Geoinformation — Erdbeobachtung und Erdmessung (ISO 19156:2011); Englische Fassung EN ISO 19156:2013*

DIN ISO 2859 (alle Teile), *Annahmestichprobenprüfung anhand der Anzahl fehlerhafter Einheiten oder Fehler (Attributprüfung)*

DIN ISO 3534-2:2013-12, *Statistik — Begriffe und Formelzeichen — Teil 2: Angewandte Statistik (ISO 3534-2:2006); Text Deutsch und Englisch*

DIN ISO 3951-1, *Verfahren für die Stichprobenprüfung anhand quantitativer Merkmale (Variablenprüfung) — Teil 1: Spezifikation für Einfach-Stichprobenanweisungen für losweise Prüfung, geordnet nach der annehmbaren Qualitätsgrenzlage (AQL) für ein einfaches Qualitätsmerkmal und einfache AQL*

DIN ISO 8601-1, *Datum und Uhrzeit — Darstellung für den Informationsaustausch — Teil 1: Grundlegende Regeln*

English Version

Geographic information -
Data quality -
Part 1: General requirements (ISO 19157-1:2023)

Information géographique -
Qualité des données -
Partie 1: Exigences générales (ISO 19157-1:2023)

Geoinformation -
Datenqualität -
Teil 1: Allgemeine Anforderungen (ISO 19157-1:2023)

This European Standard was approved by CEN on 7 February 2023.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 19157-1:2023) has been prepared by Technical Committee ISO/TC 211 "Geographic information/Geomatics" in collaboration with Technical Committee CEN/TC 287 "Geographic Information" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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Endorsement notice

The text of ISO 19157-1:2023 has been approved by CEN as EN ISO 19157-1:2023 without any modification.

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Foreword

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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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This document was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 287, *Geographic Information*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition of ISO 19157-1, together with ISO 19157-3, cancels and replaces the first edition (ISO 19157:2013), which has been technically revised. It also incorporates the Amendment ISO 19157:2013/Amd 1:2018.

The main changes are as follows:

- terminology has been harmonized;
- the unique identification of normative components has been added;
- the definition of the data quality model extension has been added;
- the data quality measures have been moved into a new project on a standard data quality measures register;
- the conformance requirements have been updated;
- the usage of package prefixes for type name has been omitted;
- the 'usability' data quality element has been removed from the model;
- a new clause on extending the standard quality model and the quality measures has been added;
- the abstract test suite has been revised;
- requirements for XML schema implementation have been added;
- information on backwards compatibility with superseded edition of this document has been included.

A list of all parts in the ISO 19157 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.

Introduction

Geographic data are increasingly being shared, interchanged and used for purposes other than their producers' intended ones. Information about the quality of available geographic data is vital to the process of selecting a dataset in that the value of data are directly related to their quality. A user of geographic data can have multiple datasets from which to choose. Therefore, it is necessary to compare the quality of the datasets to determine which best fulfils the requirements of the user.

The purpose of describing the quality of geographic data is to facilitate the comparison and selection of the dataset best suited to application needs or requirements. Complete descriptions of the quality of a dataset will encourage the sharing, interchange and use of appropriate datasets. Information on the quality of geographic data allows a data producer to evaluate how well a dataset meets the criteria set forth in its product specification and assists data users in evaluating a product's ability to satisfy the requirements for their particular application. For the purpose of this evaluation, clearly-defined procedures are used in a consistent manner.

To facilitate comparisons, it is essential that the results of the quality are expressed in a comparable way and that there is a common understanding of the data quality measures that have been used. These data quality measures provide descriptors of the quality of geographic data through comparison with the universe of discourse. The use of incompatible measures makes data quality comparisons impossible to perform. This document standardizes the components and structures of data quality measures and defines commonly used data quality measures.

This document recognizes that a data producer and a data user can potentially view data quality from different perspectives. Conformance quality levels can be set using the data producer's product specification or a data user's data quality requirements. If the data user requires more data quality information than that provided by the data producer, the data user can follow the data producer's data quality evaluation process flow to get the additional information. In this case the data user requirements are treated as a product specification for the purpose of using the data producer process flow.

The objective of this document is to provide a framework for defining the quality of geographic data. This includes principles for evaluating quality, a conceptual model for handling quality information, a structure and content of data quality measures, and guidelines for reporting a quality evaluation. The framework is extensible, with rules for how to add additional data quality measures. It also provides for complex dimensions of data quality.

Geographic information — Data quality —

Part 1: General requirements

1 Scope

This document establishes the principles for describing the quality of geographic data. It:

- defines a well-considered system of components for describing data quality;
- defines the process for defining additional, domain-specific components for describing data quality;
- specifies components and the content structure of data quality measures;
- describes general procedures for evaluating the quality of geographic data;
- establishes principles for reporting data quality.

This document is applicable to data producers providing quality information to describe and assess how well a dataset conforms to its product specification and to data users attempting to determine whether or not specific geographic data are of sufficient quality for their particular application.

This document does not attempt to define minimum acceptable levels of quality for geographic data. Such information is usually present as a requirement in a data product specification, defined in accordance with ISO 19131, for example.

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 19103:2015, *Geographic information — Conceptual schema language*

ISO 19109:2015, *Geographic information — Rules for application schema*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

accuracy

closeness of agreement between a test result or measurement result and the true value

Note 1 to entry: In this document, the true value can be a reference value that is accepted as true.

[SOURCE: ISO 3534-2:2006, 3.3.1, modified — Notes 1, 2 and 3 to entry have been removed. A new Note 1 to entry has been added.]

3.2

conformance

conformity

fulfilment of a requirement

Note 1 to entry: When there is no ambiguity, the modifier “conformance” may be omitted. For example, “test report” is the same as “conformance test report”.

[SOURCE: ISO 19105:2022, 3.4]

3.3

conformance quality level

threshold value or set of threshold values for data quality results used to determine how well a dataset meets the criteria set forth in its data product specification or user requirements

3.4

correctness

correspondence with the universe of discourse

3.5

coverage

feature that acts as a function to return values from its range for any direct position within its domain

[SOURCE: ISO/FDIS 19123-1:—,¹⁾ 3.1.8]

3.6

data product specification

specification of a data product together with additional information that will enable it to be created, supplied to and used by another party

Note 1 to entry: A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a data product. It may be used for production, sales, end-use or other purposes.

Note 2 to entry: A specification is a document stating requirements (see ISO 9000:2015, 3.8.7).

Note 3 to entry: A data product is a dataset or a dataset series that may be supplied (see ISO 19131:2022, 3.8),

[SOURCE: ISO 19131:2022, 3.9, modified — Notes 2 and 3 to entry have been added.]

3.7

data quality

degree to which a set of inherent characteristics of data fulfils requirements

[SOURCE: ISO 8000-2:2022, 3.8.1, modified — Note 1 to entry has been removed.]

3.8

data quality measure

variable to which a value is assigned as the result of measurement of a data quality characteristic

[SOURCE: ISO/IEC 25012:2008, 4.5, modified — Note 1 to entry has been removed.]

3.9

data quality unit

combination of a scope and data quality elements

1) Under preparation. Stage at the time of publication: ISO/FDIS 19123-1:2023.

3.10

dataset

identifiable collection of data

Note 1 to entry: A dataset can be a smaller grouping of data which, though limited by some constraint such as spatial extent or *feature type*, is located physically within a larger dataset. Theoretically, a dataset can be as small as a single *feature* or *feature attribute* contained within a larger dataset. A hardcopy map or chart can be considered a dataset.

[SOURCE: ISO 19115-1:2014, 4.3]

3.11

dataset series

collection of datasets sharing common characteristics

[SOURCE: ISO 19115-1:2014, 4.4]

3.12

feature

abstraction of real world phenomena

Note 1 to entry: A feature can occur as a type or an instance. Feature type or feature instance will be used when only one is meant.

[SOURCE: ISO 19101-1:2014, 4.1.11]

3.13

feature attribute

characteristic of a feature

Note 1 to entry: A feature attribute has a name, a data type and a value domain associated with it. A feature attribute for a feature instance also has an attribute value taken from the value domain.

[SOURCE: ISO 19101-1:2014, 4.1.12 modified — Examples 1 and 2, and Notes 2 and 3 to entry have been removed.]

3.14

feature instance

individual of a given feature type having specified feature attribute values

[SOURCE: ISO 19101-1:2014, 4.1.14]

3.15

feature operation

operation that every instance of a feature type may perform

[SOURCE: ISO 19110:2016, 3.7, modified — Example and Note 1 to entry have been removed.]

3.16

feature type

class of features having common characteristics

[SOURCE: ISO 19156:2011, 4.7]

3.17

geographic data

data with implicit or explicit reference to a location relative to the Earth

[SOURCE: ISO 19109:2015, 4.13, modified — Note 1 to entry has been removed.]

3.18

item

anything that can be described and considered separately

Note 1 to entry: An item can be any part of a *dataset*, such as a *feature*, feature relationship, *feature attribute*, or combination of these.

[SOURCE: ISO 2859-5:2005, 3.4, modified — Example has been removed. Note 1 to entry has been added.]

3.19

lineage

provenance, source(s) and production process(es) used in producing a resource

[SOURCE: ISO 19115-1:2014, 4.9]

3.20

metadata

information about a resource

[SOURCE: ISO 19115-1:2014, 4.10]

3.21

metaquality

information describing the quality of data quality

3.22

quality

degree to which a set of inherent characteristics of an object fulfils requirements

[SOURCE: ISO 9000:2015, 3.6.2, modified — Note 1 and 2 to entry have been removed.]

3.23

quality evaluation

systematic examination of the extent to which an entity is capable of fulfilling specified requirements

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.3267, modified — Note 1 to entry has been removed.]

3.24

register

set of files containing identifiers assigned to items with descriptions of the associated items

[SOURCE: ISO 19135-1:2015, 4.1.9]

3.25

requirement

need or expectation that is stated, generally implied or obligatory

[SOURCE: ISO 9000:2015, 3.6.4, modified — Notes 1-6 to entry have been removed.]

3.26

quality evaluation report

quality report

free text document providing fully-detailed information about data quality evaluations, results and measures used

3.27

uncertainty

measurement uncertainty

parameter, associated with the result of measurement, that characterizes the dispersion of values that could reasonably be attributed to the measurand

Note 1 to entry: Uncertainty of measurement comprises, in general, many components. Some of these components may be evaluated from the statistical distribution of the results of series of measurements and can be characterized by experimental standard deviations. The other components, which can also be characterized by standard deviations, are evaluated from assumed probability distributions based on experience or other information.

[SOURCE: ISO 19116:2019, 3.28, modified — Note 1 to entry has been removed and replaced with Note 2 to entry from ISO 19101-2:2018, 3.40.]

3.28

universe of discourse

view of the real or hypothetical world that includes everything of interest

[SOURCE: ISO 19101-1:2014, 4.1.38]

4 Abbreviated terms and packages

4.1 Abbreviated terms

ADQR	aggregated data quality result
AQL	acceptance quality limit
GML	Geographic Markup Language
UML	Unified Modelling Language
XML	Extensible Markup Language

4.2 Abbreviated packages

Abbreviations are used to denote the package that contains a class. Those abbreviations precede class names, connected by a “_”. A list of those abbreviations is listed in Table 1. The International Standard in which the classes are located is indicated in parentheses.

Table 1 — Package abbreviations

CI	Citation [ISO 19115-1:2014]
DS	Dataset [ISO 19115-1:2014]
GF	General Feature [ISO 19109:2015]
LI	Lineage [ISO 19115-1:2014]
MD	Metadata [ISO 19115-1:2014]

5 Conformance

5.1 General

In this document two conformance classes are defined (see 5.2 and 5.3). The related tests are provided in the abstract test suit in Annex A.

Requirements, recommendations and permissions are explicitly marked and assigned a requirement, recommendation or permission identifier.

The name and contact information of the maintenance agency for this document can be found at www.iso.org/maintenance_agencies.

5.2 Content of a data quality model

Table 2 describes the conformance class for the content of a data quality definition.

Table 2 — Content conformance class

Conformance class	https://standards.iso211.org/19157/-1/1/conf/content
Standardization target type	Instance of a data quality definition, regardless of data encoding.
Dependency	https://standards.iso211.org/19103/-1/ (Conceptual schema language) https://standards.iso211.org/19109/-2/ (Rules for application schema) https://standards.iso211.org/19115/-1/1/ (Metadata – Part 1: Fundamentals)
Requirements class	https://standards.iso211.org/19157/-1/1/req/content (see Clause 6)
Tests	All tests in Clause A.1.

5.3 XML encoding of a data quality model

Table 3 describes the conformance class for the XML representation of a data quality model.

Table 3 — XML encoding conformance class

Conformance class	https://standards.iso211.org/19157/-1/1/conf/xml
Standardization target type	XML document representing a data quality model.
Dependency	https://standards.iso211.org/19157/-1/1/conf/content
Requirements class	https://standards.iso211.org/19157/-1/1/req/xml (see Clause 12)
Tests	All tests in Clause A.2.

6 General requirements for geographic information quality

6.1 General

Clauses 8 to 11 describe the components of data quality based on the conceptual Unified Modelling Language (UML) model defined in this document, which is part of the ISO/TC 211 harmonized model. Furthermore, additional descriptions, requirements and recommendations are included. A dictionary of elements in the UML model is provided in Annex C.

The requirements, recommendations and permissions defined in this document are summarized in Tables 4, 5 and 6.

6.2 Data quality — general requirements, recommendations and permissions

Table 4 lists the requirements defined in this document.

Table 4 — List of requirements

Requirement class	https://standards.iso211.org/19157/-1/1/req/content
Standardization target type	Instance of a data quality definition regardless of data encoding.
Dependency	https://standards.iso211.org/19103/-1/1/ (Conceptual schema language)
Dependency	https://standards.iso211.org/19109/-1/2/ (Rules for application schema)
Dependency	https://standards.iso211.org/19115/-1/1/ (Metadata — Part 1: Fundamentals)
Requirement 1	https://standards.iso211.org/19157/-1/1/req/content/dataQuality
Requirement 2	https://standards.iso211.org/19157/-1/1/req/content/additionalQualityElement
Requirement 3	https://standards.iso211.org/19157/-1/1/req/content/qualityMeasure
Requirement 4	https://standards.iso211.org/19157/-1/1/req/content/additionalQualityMeasure
Requirement 5	https://standards.iso211.org/19157/-1/1/req/content/dataQualityMetadata
Requirement 6	https://standards.iso211.org/19157/-1/1/req/content/qualityEvaluationReport
Requirement 7	https://standards.iso211.org/19157/-1/1/req/content/aggregatedResult
Requirement 8	https://standards.iso211.org/19157/-1/1/req/xml

In addition to the requirements class in Table 4, a recommendations class is defined in Table 5 and a permission class is defined in Table 6. These recommendations and permissions, when implemented, can contribute to improved content of a data quality definition. However, recommendations and permissions are optional and do not have an impact on the results of the conformance testing; thus the recommendation class in Table 5 and the permission class defined in Table 6 are not related to any of the conformance classes defined in Clause 4.

Table 5 — List of recommendations

Recommendation class	https://standards.iso211.org/19157/-1/1/req/optionalContent
Standardization target type	Instance of a data quality definition regardless of data encoding.
Dependency	https://standards.iso211.org/19157/-1/1/req/content
Recommendation 1	https://standards.iso211.org/19157/-1/1/rec/optionalContent/dateTime
Recommendation 2	https://standards.iso211.org/19157/-1/1/rec/optionalContent/identifier
Recommendation 3	https://standards.iso211.org/19157/-1/1/rec/optionalContent/additionalQualityMeasure
Recommendation 4	https://standards.iso211.org/19157/-1/1/rec/optionalContent/description
Recommendation 5	https://standards.iso211.org/19157/-1/1/rec/optionalContent/qualityEvaluationProcess
Recommendation 6	https://standards.iso211.org/19157/-1/1/rec/optionalContent/evaluationMethodType
Recommendation 7	https://standards.iso211.org/19157/-1/1/rec/optionalContent/reportReference
Recommendation 8	https://standards.iso211.org/19157/-1/1/rec/optionalContent/aggregatedResult
Recommendation 9	https://standards.iso211.org/19157/-1/1/rec/optionalContent/sameQualityElement
Recommendation 10	https://standards.iso211.org/19157/-1/1/rec/optionalContent/differentQualityElement
Recommendation 11	https://standards.iso211.org/19157/-1/1/rec/optionalContent/qualityEvaluationReport
Recommendation 12	https://standards.iso211.org/19157/-1/1/rec/optionalContent/derivedResultMetadata
Recommendation 13	https://standards.iso211.org/19157/-1/1/rec/optionalContent/hierarchy

Table 6 lists the permissions defined in this document.

Table 6 — List of permissions

Permission class	https://standards.iso211.org/19157/-1/1/req/permitedContent
Standardization target type	Instance of a data quality definition regardless of data encoding.
Dependency	https://standards.iso211.org/19157/-1/1/req/content
Permission 1	https://standards.iso211.org/19157/-1/1/per/permitedContent/additionalQualityElement
Permission 2	https://standards.iso211.org/19157/-1/1/per/permitedContent/conformanceResult
Permission 3	https://standards.iso211.org/19157/-1/1/per/permitedContent/sourceReference

7 Overview of data quality

Working with data quality includes the following points.

- Understanding the concepts of data quality related to geographic data. Annex B provides a description of data quality concepts used to establish the components for describing the quality of geographic data.
- Defining data quality conformance levels in data product specifications or based on user requirements. Establishment of data product specifications is described in ISO 19131.
- Specifying quality aspects in application schemas.
- Evaluating data quality and metaquality.
- Reporting data quality and metaquality.

NOTE 1 The development of application schemas is described in ISO 19109.

A data quality evaluation can be applied to a dataset series, a dataset or a subset of data within a dataset sharing common characteristics so that its quality can be evaluated.

Data quality elements and their descriptors are used to describe how well a dataset meets the criteria set forth in its data product specification or user requirements and provide quantitative quality information.

Requirement 1:	https://standards.iso211.org/19157/-1/1/req/content/dataQuality
	Data quality shall be described in conformance with the components of data quality and data quality measures as defined by the UML figures in Clauses 8 and 9 of this document.

When data quality information describes data that have been created without a detailed data product specification or with a data product specification that lacks quantitative measures and descriptors, data quality may be evaluated in a non-quantitative subjective way with a descriptive result (see 8.5.4.4) used to report the evaluation result for each of the applicable data quality elements.

Some quality-related information is provided by purpose, usage and lineage. This information is reported as metadata in conformance with ISO 19115-1.

NOTE 2 'Purpose' describes the rationale for creating a dataset and contains information about its intended use, which can potentially be not the same as the actual use of the dataset. 'Usage' describes the application(s) for which a dataset has been used, either by the data producer or by other data users. 'Lineage' describes the history of a dataset and recounts the life cycle of a dataset from collection and acquisition through compilation and derivation to its current form. This general, non-quantitative information is illustrative for users and can help in assessing the quality of a dataset, especially in cases where it is used for a particular application that differs from the intended application (see also 10.2.3).

This document recognizes that data quality elements may have associated quality which is termed metaquality. Metaquality describes the quality of the data quality results in terms of defined characteristics.

NOTE 3 The concept of metaquality is described in 8.3.7 and the descriptors of metaquality are defined in 8.5.5.

Figure 1 provides an overview of data quality information.

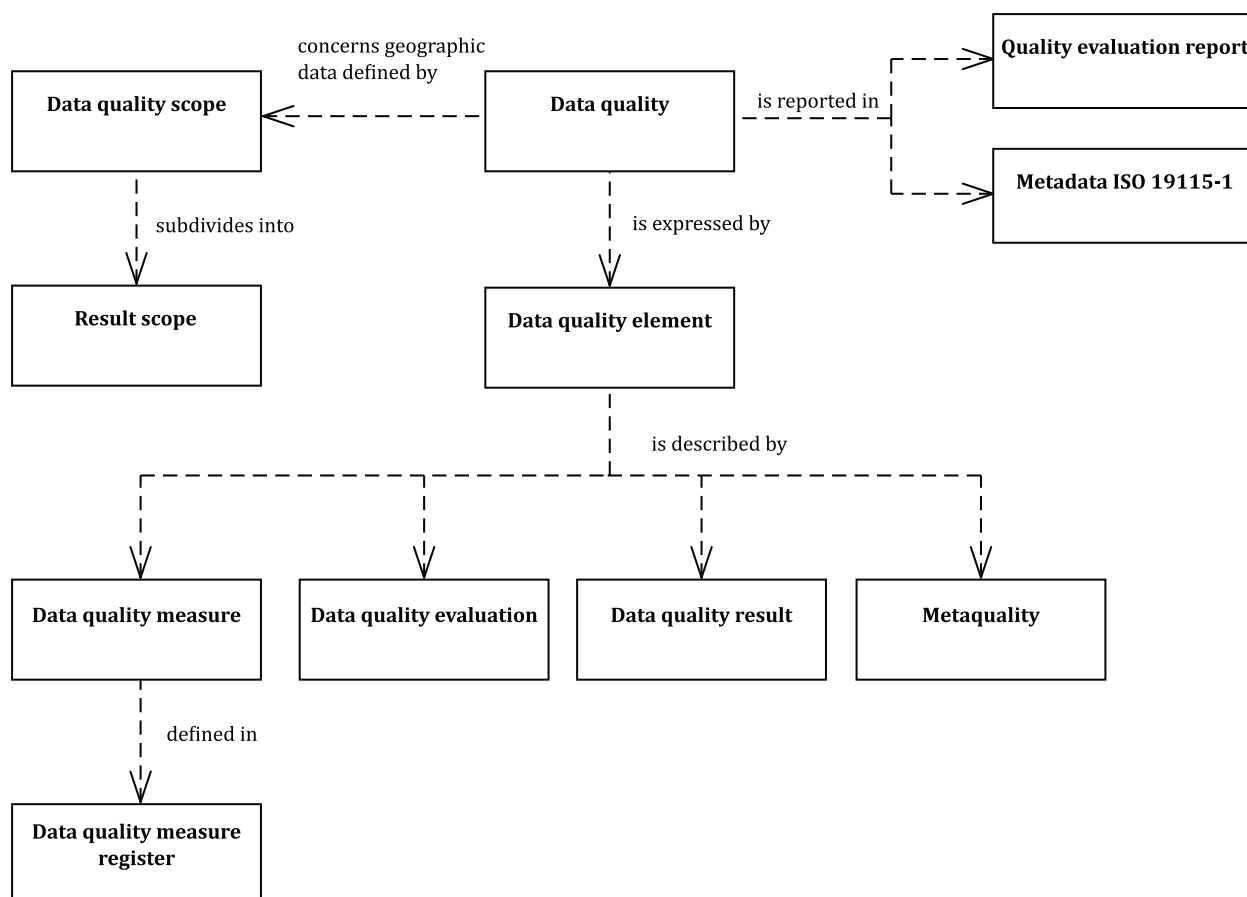


Figure 1 — Conceptual model of quality for geographic data

8 Components of data quality

8.1 Overview of the components

The components of data quality are described in Clause 8. Figure 2 presents an overview of the components and the connections between them. See the data dictionary defined in Annex C for more details about components and their attributes.

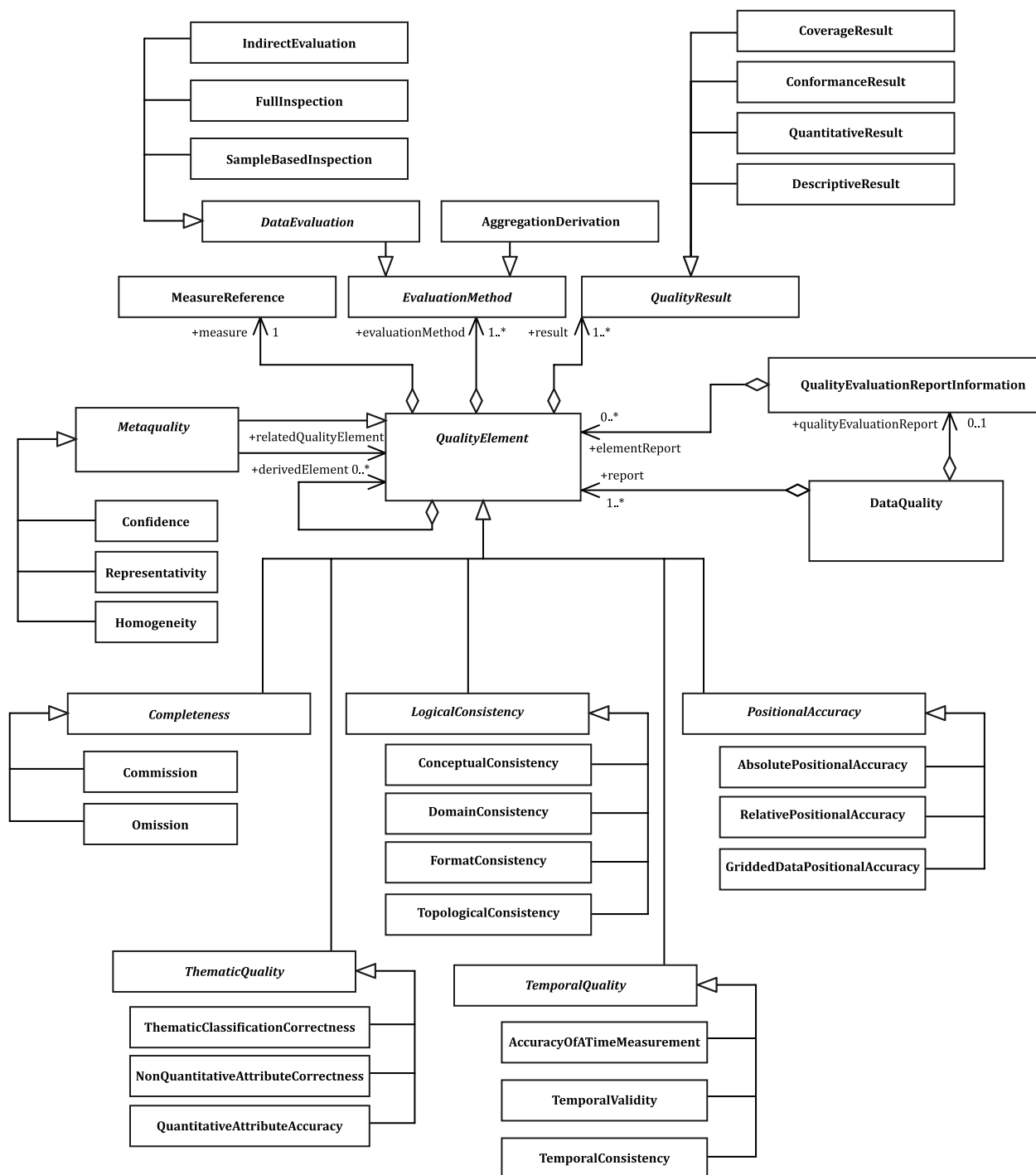


Figure 2 — Overview of the components of data quality

8.2 Data quality unit

When describing the quality of geographic data, different quality elements and different subsets of the data may be considered. In order to describe these, data quality units are used. A data quality unit is the combination of a scope and data quality elements; see Figure 3 and Table C.1.

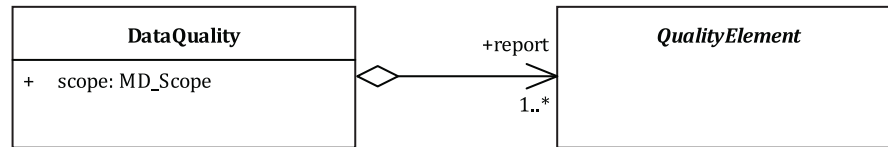


Figure 3 — Data quality unit

The scope of the data quality unit(s) specifies the extent, spatial and/or temporal, and/or common characteristic(s) that identify the data on which data quality is to be established and evaluated.

Since scopes are often different for individual data quality elements, one data quality report (metadata or quality evaluation report) may encompass several data quality units. These different scopes may be, for example, spatially separate, overlapping or even sharing the same extents.

NOTE If a dataset is a result of integration of datasets of various scopes, data quality values or weights of quality elements, such a new dataset needs to establish its new data quality unit, i.e. define its own data quality scope and specify quality elements of interest.

The following are examples of what defines a data quality scope (see also MD_Scope in ISO 19115-1):

- a) a dataset series;
- b) a dataset;
- c) a subset of data defined by one or more of the following characteristics:
 - 1) types of items (sets of feature types, feature attributes, feature operations or relationships among features),
 - 2) specific items (sets of feature instances, attribute values or instances of feature relationships),
 - 3) geographic extent,
 - 4) temporal extent (the time frame of reference and accuracy of the time frame);
- d) a coverage.

8.3 Data quality elements

8.3.1 General

A data quality element is a component describing a certain aspect of the quality of geographic data. In this document, these have been organized into groups of quality elements, with each group defined in 8.3.2 to 8.3.7. The relationship among various aspects of quality and their corresponding quality elements are illustrated in Figure 4, where groups of elements are represented by abstract classes and elements are represented by their subclasses.

NOTE Depending on the tool used and/or organizational preferences, implementations of the data quality conceptual model presented in Figure 4 vary. Advising on best implementation practice is out of the scope of this document.

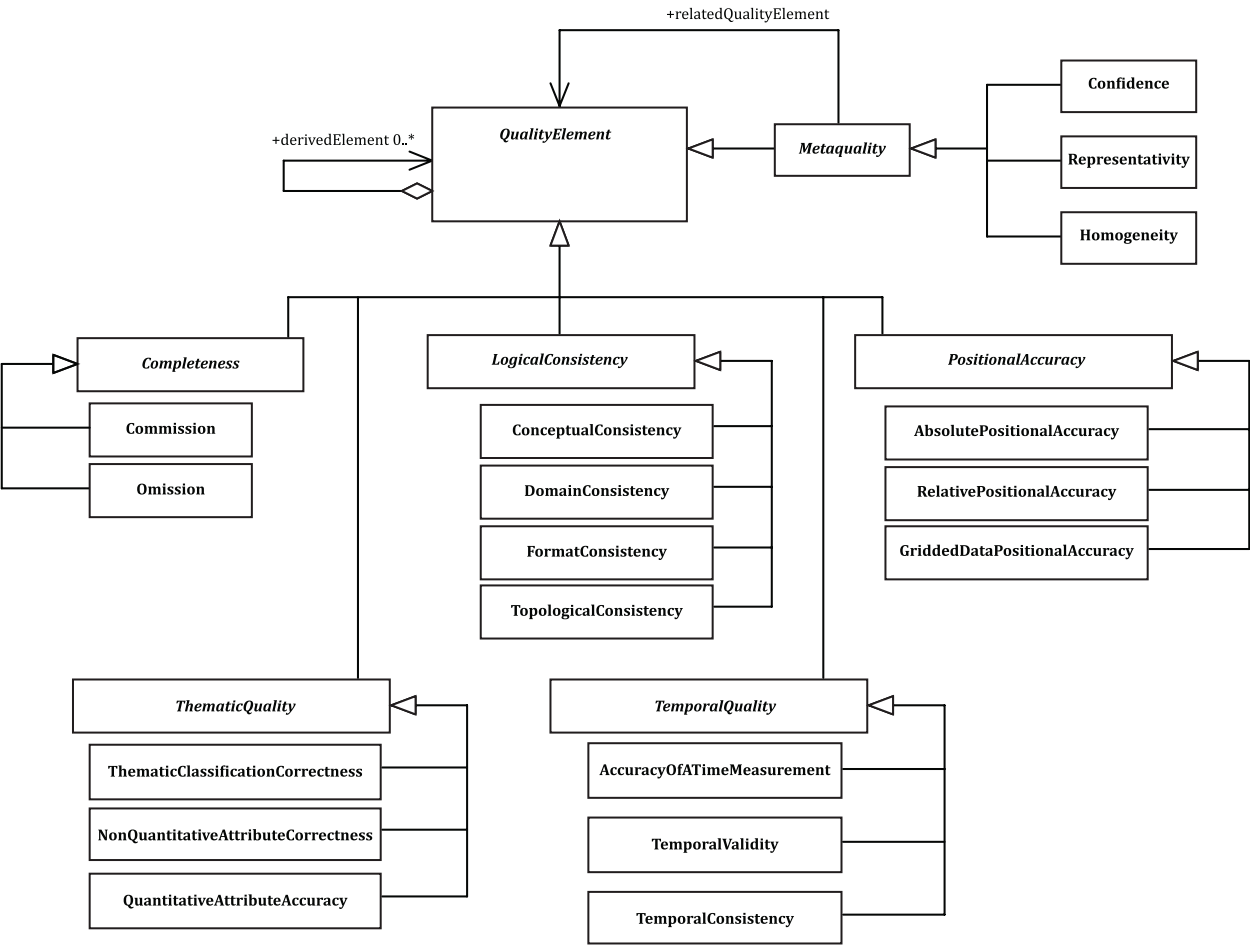


Figure 4 — Overview of the data quality elements

Permission 1:	https://standards.iso/211.org/19157/-1/1/per/permittedContent/additionalQualityElement
	If quality elements defined in this document are not sufficient for expressing the quality of the dataset, new elements can be defined and used according to the requirements specified in 8.4.

8.3.2 Completeness

Completeness is defined as a degree to which a dataset (or dataset series) representing a feature (or features) has values for all expected attributes and related entity instances at the time at which the dataset has been created (ISO 8000-2; ISO/IEC 25012). As such, completeness refers to the presence and/or absence of features, their attributes and relationships. In this document, two elements (and their associated measures) define completeness:

- commission: excess data present in a dataset;
- omission: data absent from a dataset.

8.3.3 Logical consistency

Logical consistency is defined as the degree of adherence to logical rules of data structure, attribution and relationships (data structure can be conceptual, logical or physical). If these logical rules are documented elsewhere (for example, in a data product specification) then the source should be

referenced (for example, in the data quality evaluation). This document specifies logical consistency with data quality elements (and their associated measures):

- conceptual consistency: adherence to rules of the conceptual schema;
- domain consistency: adherence of values to the value domains;
- format consistency: degree to which data are stored in accordance with the physical structure of the dataset;
- topological consistency: correctness of the explicitly encoded topological characteristics of a dataset.

8.3.4 Positional accuracy

Positional accuracy relates to measurement accuracy (ISO/IEC Guide 98-3; ISO/IEC Guide 99) and it represents a closeness of agreement between a measured position of features and a position accepted as true within a spatial reference system. Depending on the scope and type of the reference system, this document specifies the following three data quality elements for expressing positional accuracy:

- absolute or external accuracy: closeness of reported coordinate values to values accepted as true in a standard coordinate reference system;
- relative or internal accuracy: closeness of the relative positions of features in a related dataset to their respective relative positions accepted as true in a local coordinate reference system;
- gridded data positional accuracy: closeness of gridded data spatial position values to values accepted as true.

Positional accuracy is an estimate of the uncertainty of measurement results (ISO 19116) and should therefore be expressed with measures of uncertainty.

8.3.5 Temporal quality

Temporal quality is defined as the quality of the temporal attributes and temporal relationships of features. Temporal quality can be described by the following data quality elements (and their associated measures):

- accuracy of a time measurement: closeness of reported time measurements to values accepted as true;
- temporal consistency: correctness of the order of events.
- temporal validity: validity of data with respect to time.

NOTE 1 Timeliness, currentness (ISO/IEC 25012), up-to-dateness and actuality are used as synonyms for temporal validity.

NOTE 2 Temporal validity is different from domain consistency of temporal values. For example, a value of '33 March 2020' representing a date indicates a domain inconsistency. An example of temporal invalidity is a dataset that contains objects that did not exist in the timestamp associated with their record.

8.3.6 Thematic quality

Thematic quality is defined as the accuracy of quantitative attributes and the correctness of non-quantitative attributes and of the classifications of features and their relationships. This document specifies thematic quality with three data quality elements (and their associated measures):

- classification correctness: comparison of the classes assigned to features or their attributes to a universe of discourse (e.g. ground truth or reference data);

- non-quantitative attribute correctness: measure of whether a non-quantitative attribute is correct or incorrect;
- quantitative attribute accuracy: closeness of the value of a quantitative attribute to a value accepted as or known to be true.

8.3.7 Metaquality elements

Metaquality elements are a set of quantitative and qualitative statements about a quality evaluation and its result. The knowledge about the quality and the suitability of the evaluation method, the measure applied, and the given result may be of the same importance as the result itself.

See D.5.3 for an example of metaquality evaluation.

Metaquality should be described using the following elements.

- Confidence: trustworthiness of a data quality result.

NOTE 1 Quantitative figures for confidence can be obtained by statistical parameters such as standard deviation or a confidence interval on a given confidence level.

EXAMPLE Confidence originates primarily from the method used and its reliability, as well as, to a lesser extent, from the concerned population.

- Representativity: degree to which the sample used has produced a result which is representative of the data within the data quality scope.

NOTE 2 A statistical method based on sampling could be considered as reliable as a global method when all the geographic zones and concerned time periods are covered and the population is sufficiently large. It is not only the size of the sample which is crucial but also how well it represents the actual state of the data. See also 10.2.2 and Annex E.

- Homogeneity: expected or tested uniformity of the results obtained for a data quality evaluation.

NOTE 3 Homogeneity consists of comparing the evaluation results of several segments of a global dataset. This comparison can be expressed using root mean square errors for example (as in E.5.3). In the case of a general process, homogeneity cannot be evaluated because the result is global.

NOTE 4 These tests are often conducted when data has been captured by different operators, depending on the acquisition zone or the acquisition date.

8.4 Extending the data quality information model

This document recognizes that for many domain-specific purposes, it is necessary or convenient to extend the standard data quality information model as defined in 8.3. The extension includes adding data quality elements (or one of its specializations as defined in 8.3) and data quality measures.

EXAMPLE Data producers can wish to provide means for their users to record feedback on a dataset. As an example, an information model for such feedback (i.e. new quality elements) can be defined with elements from Reference [36].

Requirement 2:	<p>https://standards.iso/211.org/19157/-1/1/req/content/additionalQualityElement</p> <p>A new quality element shall be defined as a specialization of <i>QualityElement</i>, (see 8.3) in conformance with the rules for metadata extensions (ISO 19115-1:2014, Annex C) and rules for domain profiles of standard schemas (ISO 19109:2015, 8.3).</p> <p>NOTE If applicable, elements defined in other International Standards (e.g. ISO/IEC 25000) can be used for extending the set of quality components as defined in Clause 8.</p>
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8.5 Descriptors of data quality elements

8.5.1 General

A data quality element is described by a reference to a quality measure, an evaluation method, quality result and a metaquality element. These are shown in Figure 5, and are described in 8.5.2 to 8.5.5.

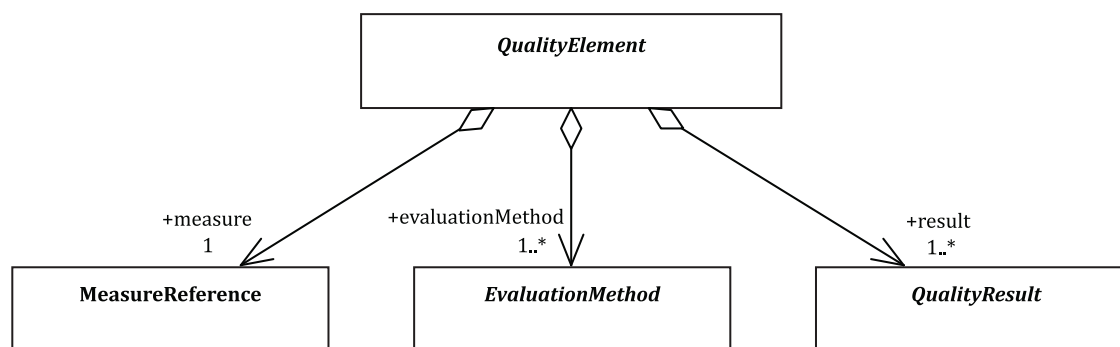


Figure 5 — Data quality element descriptors

8.5.2 Measure reference

Data quality elements refer to measures by means of a measure reference (see Figure 6), providing an identifier of a measure fully described elsewhere.

NOTE The full description can be found within a measure register or catalogue, which can form part of a data product specification or a quality evaluation report.

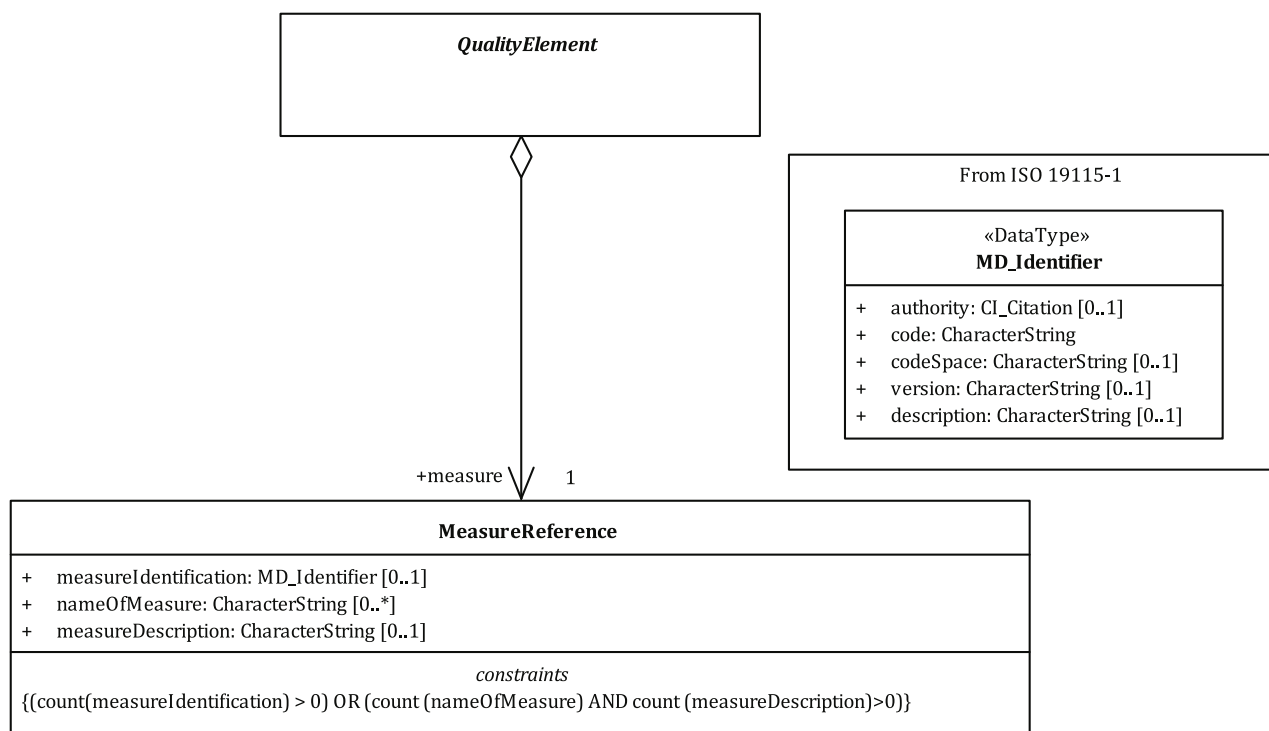


Figure 6 — Data quality measure reference

Data quality measures are further described in Clause 9 of this document.

EXAMPLE The percentage of the values of an attribute which are correct.

This document recognizes that the quality of a dataset is measured using a variety of methods. A single data quality measure can be insufficient for fully evaluating the quality of the data specified by a data quality scope and providing a measure of quality for all possible utilizations of a dataset. A combination of data quality measures can give useful information. Multiple data quality measures may be reported for the data specified by a data quality scope. The data quality report should then include one instance of *QualityElement* for each measure applied.

8.5.3 Evaluation method

A data quality evaluation method describes those procedures and methods which are applied to the geographic data to arrive at a data quality result; see Figure 7. Different evaluations are often used for the various data quality elements.

A data quality evaluation method is used for describing, or for referencing documentation describing, the methodology used to apply a data quality measure to the data specified by a data quality scope.

NOTE Data quality evaluation is further described in Clause 10.

EXAMPLE Examples of documentation are data product specifications (e.g. ISO 19131), published articles or accepted industry standards.

Recommendation 1:	https://standards.isotc211.org/19157/-1/1/rec/optionalContent/dateTime
	One date or range of dates (conforming to ISO 19108) should be included for each evaluation. If the evaluation was carried out on non-consecutive dates, each single date should be included.

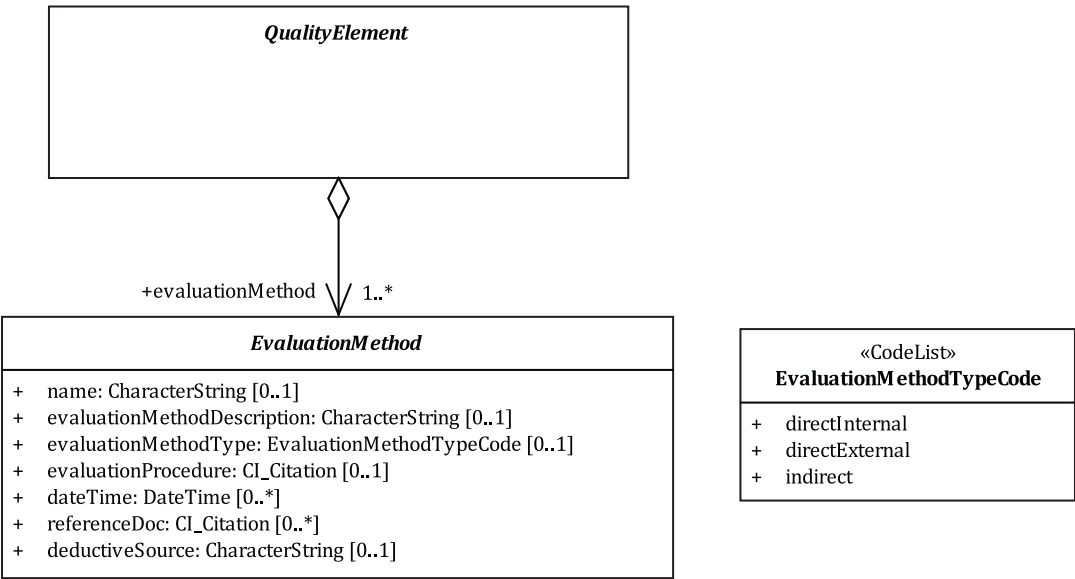


Figure 7 — Data quality evaluation method

8.5.4 Quality result

8.5.4.1 General

A data quality result is provided for each data quality element. This can be a quantitative result, a conformance result, a descriptive result or a coverage result; see also Figure 8.

NOTE Different types of results can be provided for the same data quality element.

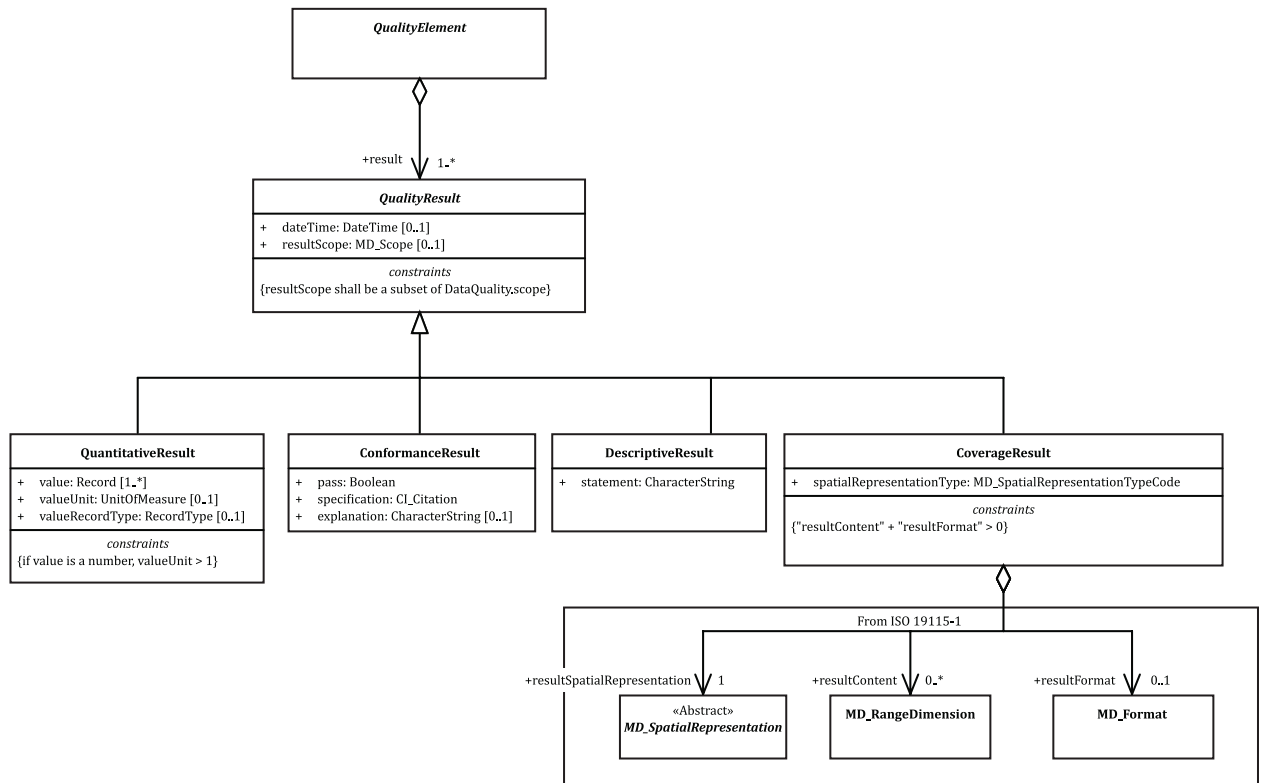


Figure 8 — Data quality result

Quality frequently differs between various parts of the dataset for which quality is evaluated. Therefore, several evaluations may be applied for the same data quality element to more fully and in more detail describe quantitative data quality. To avoid repeating the measure and evaluation procedure descriptions in several instances of data quality element (*QualityElement*), several results with individual result scopes can be used.

EXAMPLE A dataset contains features of identical type but whose positions have been established with various methods yielding different positional accuracies. The same quality evaluation method and the same measure are, however, applied for the whole dataset, and provide different results depending on the data acquisition method. In this case, it can be desirable to have several results with individual result scopes (the area covered by each data acquisition method) and one data quality scope (the dataset).

8.5.4.2 Quantitative result

A quantitative result may be a single value or multiple values, depending on the values of attributes *valueType* and *valueStructure* defined in the description of the measure applied.

The attribute *valueRecordType* is used to describe how the *valueType* and *valueStructure* defined in the measure are implemented to provide the value of the quantitative result.

NOTE The attribute *valueRecordType* is of type *RecordType*, which is a generic data type defined in ISO 19103. Its value changes depending on which implementation solution is used for providing the quantitative result. An example of Extensible Markup Language (XML) implementation for *recordType* is provided in ISO/TS 19139-1.

EXAMPLE 1 Using an XML implementation: simple example: *value* = 5, *valueRecordType* = *gco:Integer*, *valueUnit* = "metre."

EXAMPLE 2 Within the description of the measure, the *valueType* is an integer, the *valueStructure* is an $n \times n$ (square) matrix. The *value* attribute of the quantitative result provides the result matrix itself, within a numeric encoding using a particular XML type called *MatrixType*. The attribute *valueRecordType* provides the description of the type *MatrixType* in XML. If another encoding is used, the attribute *valueRecordType* will change to provide the description of the type *Matrix* in the other encoding, and the implementation of the attribute value will change accordingly, but the value itself will not change.

EXAMPLE 3 Measure “Rate of excess items” is used to evaluate the number of excess items in the dataset in relation to the number of items that are expected to be present. The quantitative result value is of value type Real. The value unit is used in this case to show that the value is a percentage; the value has been multiplied by 100. In this example the value unit is “%”.

8.5.4.3 Conformance result

A conformance result is the outcome of comparing the value or set of values obtained from applying a measure to the data specified by a data quality scope with a specified conformance quality level (e.g. as recorded in an ISO 19131-conformant data product specification).

When a conformance quality level is defined, the obtained result is compared with this to evaluate if the quality of the data meets the specified level of quality.

A conformance result may be provided for each measure. The conformance quality level is typically specified in suitable reference documentation such as the data product specification (e.g. an ISO 19131-conformant data product specification) or a user-defined requirements specification. If conformance is evaluated, a reference to the relevant reference documentation shall be made and the conformance quality level used shall be specified.

The conformance result is not to be used for specifying the conformance quality level in an ISO 19131-conformant data product specification.

Recommendation 2:	https://standards.iso211.org/19157/-1/1/rec/optionalContent/identifier
	An <i>identifier</i> should be provided for the <i>specification</i> attribute of <i>ConformanceResult</i> .
	NOTE <i>specification</i> is of type <i>CI_Citation</i> , in which, as defined by ISO 19115-1, the <i>identifier</i> is optional.

Permission 2:	https://standards.iso211.org/19157/-1/1/per/permittedContent/conformanceResult
	If an evaluation has been performed against conformance levels originating from different sources, more than one data quality <i>ConformanceResult</i> may be provided for the same measure.

8.5.4.4 Descriptive result

In some cases (e.g. with thematic and geoscientific observations), it is not possible to produce a quantitative result for a data quality element. A subjective evaluation of an element can then be expressed with a textual statement as a data quality descriptive result.

EXAMPLE The relative positional accuracy is higher between a geological feature and a nearby feature from a base map (roads, rivers, lakes etc.) than the absolute positional accuracy on the geological feature itself.

This descriptive result can also be used to provide a short synthetic description of the result of the data quality evaluation, to accompany the complete quantitative result or replace it, if no quantitative value can be provided.

8.5.4.5 Coverage result

A data quality result can be provided as information in a coverage. A UML model for a coverage result is provided in Figure 8.