BS ISO 19160-3:2020

BSI Standards Publication

Addressing

Part 3: Address data quality

Documents
Document Sharing Hub

Full document details: BS ISO 19160-3:2020

National foreword

This British Standard is the UK implementation of ISO 19160-3:2020.

The UK participation in its preparation was entrusted to Technical Committee IST/36, Geographic information.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 580 95222 7

ICS 35.240.70

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2020.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO 19160-3:2020

INTERNATIONAL STANDARD

ISO 19160-3

First edition
2020-02

Addressing —

Part 3: Address data quality

Adressage —

Partie 3: Qualité des données d'adresse

Reference number
ISO 19160-3:2020(E)

Documents
Document Sharing Hub

© ISO 2020

Full document details: BS ISO 19160-3:2020

COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2020 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO 19160-3:2020

Contents

Page

Foreword ... **v**
Introduction ... **vi**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Conformance ... **4**
5 Symbols, notation, and abbreviated terms ... **4**
5.1 Unified modelling language ... 4
5.2 Package abbreviated terms ... 4
6 Describing the quality of address data ... **5**
7 Data quality elements for address data ... **6**
8 Measuring the quality of address data ... **7**
8.1 General ... 7
8.2 Completeness ... 7
8.2.1 General ... 7
8.2.2 Commission ... 8
8.2.3 Omission ... 8
8.3 Logical consistency ... 9
8.3.1 General ... 9
8.3.2 Conceptual consistency ... 9
8.3.3 Domain consistency ... 10
8.3.4 Format consistency ... 10
8.3.5 Topological consistency ... 10
8.4 Positional accuracy ... 10
8.4.1 General ... 10
8.4.2 Absolute or external positional accuracy ... 11
8.4.3 Relative or internal positional accuracy ... 11
8.4.4 Gridded data positional accuracy ... 11
8.5 Temporal quality ... 11
8.5.1 General ... 11
8.5.2 Accuracy of time measurement ... 11
8.5.3 Temporal consistency ... 12
8.5.4 Temporal validity ... 12
8.6 Thematic accuracy ... 12
8.6.1 General ... 12
8.6.2 Classification correctness ... 12
8.6.3 Non-quantitative attribute correctness ... 13
8.6.4 Quantitative attribute accuracy ... 13
8.7 Usability ... 14
9 Evaluation of the quality of address data ... **14**
9.1 General ... 14
9.2 Evaluation process ... 14
9.2.1 Metaquality ... 15
9.3 Address data quality evaluation methods ... 16
10 Reporting the quality of address data ... **16**
Annex A (normative) **Abstract test suites** ... **17**
Annex B (informative) **Methods for measuring address data quality** ... **19**
Annex C (informative) **Examples of evaluating and reporting address data quality** ... **23**

Documents
Document Sharing Hub

© ISO 2020 – All rights reserved

Full document details: BS ISO 19160-3:2020

Bibliography **35**

© ISO 2020 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

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 211, *Geographic information/Geomatics*.

A list of all parts in the ISO 19160 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.

© ISO 2020 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

Introduction

Addresses provide one of the most common ways to unambiguously determine an object for purposes of identification and location and yet they can vary considerably from country to country. For example, in many Euro-centric countries reference to a road network in the address is common, while addresses in countries such as Japan comprise hierarchies of administrative areas without reference to thoroughfares. Addresses serve many purposes including postal delivery, emergency response, marketing, mapping, utility planning, and land administration to name a few (ISO 19160-1).

A wide variety of address standards and/or specifications are in use around the world. The preparatory work for this document, the review summary of the ISO 19160 stage zero project describes a number of these standards which are well integrated into various operational processes and in some cases legally enforced (ISO 19160-1). In addition, ISO 19160-1 has been developed as an international standard to facilitate interoperability between existing and future address specifications.

There are also many stakeholders involved in addressing: for address assignment (e.g. local governments, postal operators); for address use (e.g. customer service providers and electronic business, local and national governments, utility service providers, election commissions); and for finding addresses (e.g. citizens, delivery and emergency response service providers). Relevant stakeholders were identified during the preparatory work of the 19160 stage zero project as well as during the development of ISO 19160-1. These stakeholders are now either involved or aware of the development of the ISO 19160 addressing standards (ISO 19160-1).

In order to organize, maintain, and provide address records, address authorities must create master address repositories that replace the numerous, often isolated and incomplete address data files from different parts of an organization with one authoritative, integrated address database (e.g. US FGDC Address). Moreover, it is common for address data from local authorities to be aggregated at higher administrative levels (e.g. regional, state, national).

The wide range of uses for addresses, as well as the need to share and aggregate address data, requires a consistent framework for measuring and reporting the quality of address data. The goal of this document is to provide address database managers, address data aggregators, and address data users with this framework. This document also recognizes that the wide range of uses for addresses means that the data quality evaluation process utilized will depend on the use of the addresses being evaluated.

This document is a profile of ISO 19157 and is needed due to the uniqueness and complexity of addressing. The temporal nature of addresses, their components, and the real-world objects they identify can make it difficult to determine if addresses are missing or incorrectly included in a dataset. An address is also a complex collection of information with attributes and components that often reference other objects or are restricted by other components. These are just a few of the challenges faced by address data stakeholders that this document aims to overcome. Its objective is to ensure address data quality is maintained and/or improved by establishing a set of address data quality measures. Furthermore, this document can be used to understand and communicate the quality of an address dataset when address data aggregation or sharing needs to be accomplished.

© ISO 2020 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

Addressing —

Part 3:
Address data quality

1 Scope

This document

— is a profile of ISO 19157;

— establishes a set of data quality elements and measures for describing the quality of address data;

— describes procedures for reporting data quality;

— provides guidelines for the use of the established set of data quality elements and measures for describing the quality of address data.

This document can be used by those evaluating and reporting the quality of address data such as address data managers, address data aggregators, and address data users.

This document does not attempt to define minimum acceptable levels of quality for address data.

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

ISO 19115-2, *Geographic information — Metadata — Part 2: Extensions for acquisition and processing*

ISO 19157:2013, *Geographic information — Data quality*

ISO 19160-1:2015, *Addressing — Part 1: Conceptual model*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
accuracy
closeness of agreement between a test result or measurement result and the true value

[SOURCE: ISO 3534-2:2006, 3.3.1, modified — NOTES 1 to 3 have been removed.]

© ISO 2020 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

3.2
address
structured information that allows the unambiguous determination of an object for purposes of identification and location

[SOURCE: ISO 19160-1:2015, 4.1, modified — Notes 1 to 6 to entry and EXAMPLES 1 to 4 have been removed.]

3.3
address alias
one of a set of *addresses* (3.2) unambiguously determining the same addressable object (3.9)

[SOURCE: ISO 19160-1:2015, 4.3]

3.4
address class
description of a set of addresses (3.2) that share the same address components (3.5), operations, methods, relationships, and semantics

[SOURCE: ISO 19160-1:2015, 4.4, modified — EXAMPLES 1 and 2 have been removed.]

3.5
address component
constituent part of the *address* (3.2)

[SOURCE: ISO 19160-1:2015, 4.5, modified — Notes 1 and 2 to entry have been removed.]

3.6
address position
position representing the *address* (3.2)

[SOURCE: ISO 19160-1:2015, 4.7, modified — Note 1 to entry has been removed.]

3.7
address reference system
defined set of *address components* (3.5) and the rules for their combination into addresses (3.2)

[SOURCE: ISO 19160-1:2015, 4.8]

3.8
addressing
activities involving *addresses* (3.2)

[SOURCE: ISO 19160-1:2015, 4.6]

3.9
addressable object
object that may be assigned an *address* (3.2)

[SOURCE: ISO 19160-1:2015, 4.2]

3.10
conformance
fulfilment of specified requirements

[SOURCE: ISO 19105:2000, 3.8]

3.11
correctness
correspondence with the *universe of discourse* (3.25)

[SOURCE: ISO 19157:2013, 4.5]

© ISO 2020 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

3.12
data quality basic measure
generic data *quality* (3.23) measure used as a basis for the creation of specific data quality measures

[SOURCE: ISO 19157:2013, 4.7, modified — Note 1 to entry has been removed.]

3.13
dataset
identifiable collection of data

[SOURCE: ISO 19115-1:2014, 4.3, modified — Note 1 to entry has been removed.]

3.14
direct evaluation method
method of evaluating the *quality* (3.23) of a *dataset* (3.13) based on inspection of the *items* (3.19) within the *dataset* (3.13)

[SOURCE: ISO 19157:2013, 4.10]

3.15
feature
abstraction of real-world phenomena

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

3.16
feature type
class of *features* (3.15) 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]

3.18
indirect evaluation method
method of evaluating the *quality* (3.23) of a dataset (3.13) based on external knowledge

[SOURCE: ISO 19157:2013, 4.17, modified — Note 1 to entry has been removed.]

3.19
item
anything that can be described and considered separately

[SOURCE: ISO 19157:2013, 4.18, modified — Note 1 to entry has been removed.]

3.20
metadata
information about a resource

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

3.21
metaquality
information describing the *quality* (3.23) of data quality

[SOURCE: ISO 19157:2013, 4.20]

© ISO 2020 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

3.22
profile
set of one or more base standards or subsets of base standards, and, where applicable, the identification of chosen clauses, classes, options and parameters of those base standards, that are necessary for accomplishing a particular function

[SOURCE: ISO 19106:2004, 4.5, modified — The NOTE has been removed.]

3.23
quality
degree to which a set of inherent characteristics of an object fulfils requirements

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

3.24
standalone quality report
free text document providing fully detailed information about data *quality* (3.23) evaluations, results and measures used

[SOURCE: ISO 19157:2013, 4.23]

3.25
universe of discourse
view of the real or hypothetical world that includes everything of interest

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

4 Conformance

Any address product claiming conformance to this document shall pass all the requirements described in the abstract test suite presented in Annex A as follows:

a) Address data quality shall be measured and described as outlined in A.1 and A.2;

b) An address data quality measure shall pass the tests outlined in A.3;

c) An address data quality evaluation process shall pass the tests outlined in A.4;

d) Metadata used to report the quality of address data shall pass the tests outlined in A.5;

e) A standalone address data quality report shall pass the tests outlined in A.6.

5 Symbols, notation, and abbreviated terms

5.1 Unified modelling language

In this document, conceptual schemas are presented in the Unified Modelling Language (UML). ISO 19103 Conceptual schema language presents the specific profile of UML used in this document.

5.2 Package abbreviated terms

Abbreviated terms are used to denote the package that contains a class. Those abbreviated terms precede class names, connected by a "_". The international standard in which those classes are located is indicated in parentheses. A list of those abbreviated terms follows.

© ISO 2020 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

DQ Data Quality [ISO 19157]

MD Metadata [ISO 19115-1]

CI Citation [ISO 19115-1]

6 Describing the quality of address data

This document is a profile of ISO 19157. The quality of address data is expressed by data quality elements which are described by established data quality measures, the evaluation processes for carrying out those measures, and the results of the evaluations. In addition, it is possible in some cases to describe the quality of the measures or evaluation processes themselves. Finally, address data quality is reported as metadata or in standalone quality reports.

Figure 1 provides an overview of quality for geographic data, which also applies to address data.

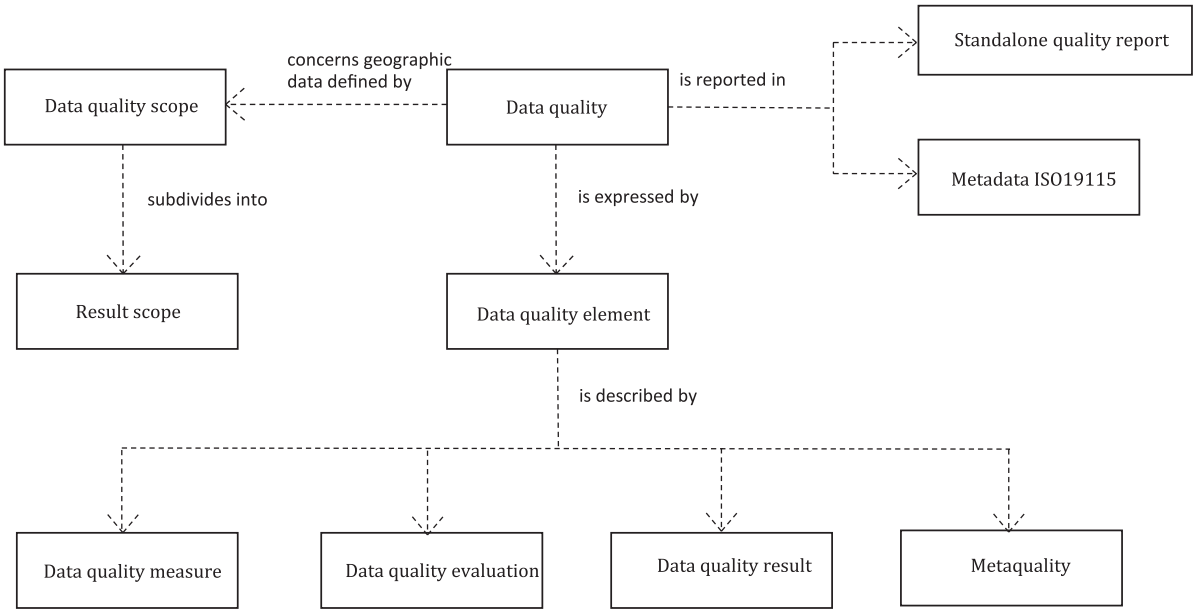

Figure 1 — Conceptual model of quality for geographic data (Source: ISO 19157:2013)

Different quality elements and different subsets of the data may be considered when describing the quality of geographic data. In order to describe these, data quality units are used. A data quality unit is the combination of a scope and data quality elements. Figure 2 describes a data quality unit.

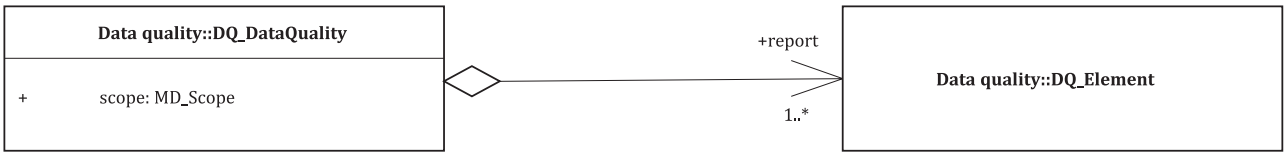

Figure 2 — Data quality unit (Source: ISO 19157:2013)

The concept of a data quality unit is important for measuring the quality of address data. Address datasets often include data from multiple sources as well as different types of addresses (known as address classes in ISO 19160-1). For example, an address data aggregator could be managing addresses used solely for mailing as well as addresses used only for location purposes. Data quality measures appropriate for one use or classification may not be appropriate for the other. In this case, the data quality unit establishes the scope (e.g. postal addresses vs. emergency services, post boxes vs. thoroughfare addresses) and the element being measured.

© ISO 2020 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020

Requirement 1. The quality of address data shall be described per data quality unit and data quality element, in conformance with ISO 19157.

7 Data quality elements for address data

This clause establishes the set of data quality elements from ISO 19157 for describing the quality of address data. The quality of address data is described according to data quality elements defined in ISO 19157:

— completeness;

— logical consistency;

— positional accuracy;

— temporal quality;

— thematic accuracy;

— usability.

The quality elements of address data are identical to ISO 19157 and are shown in Figure 3.

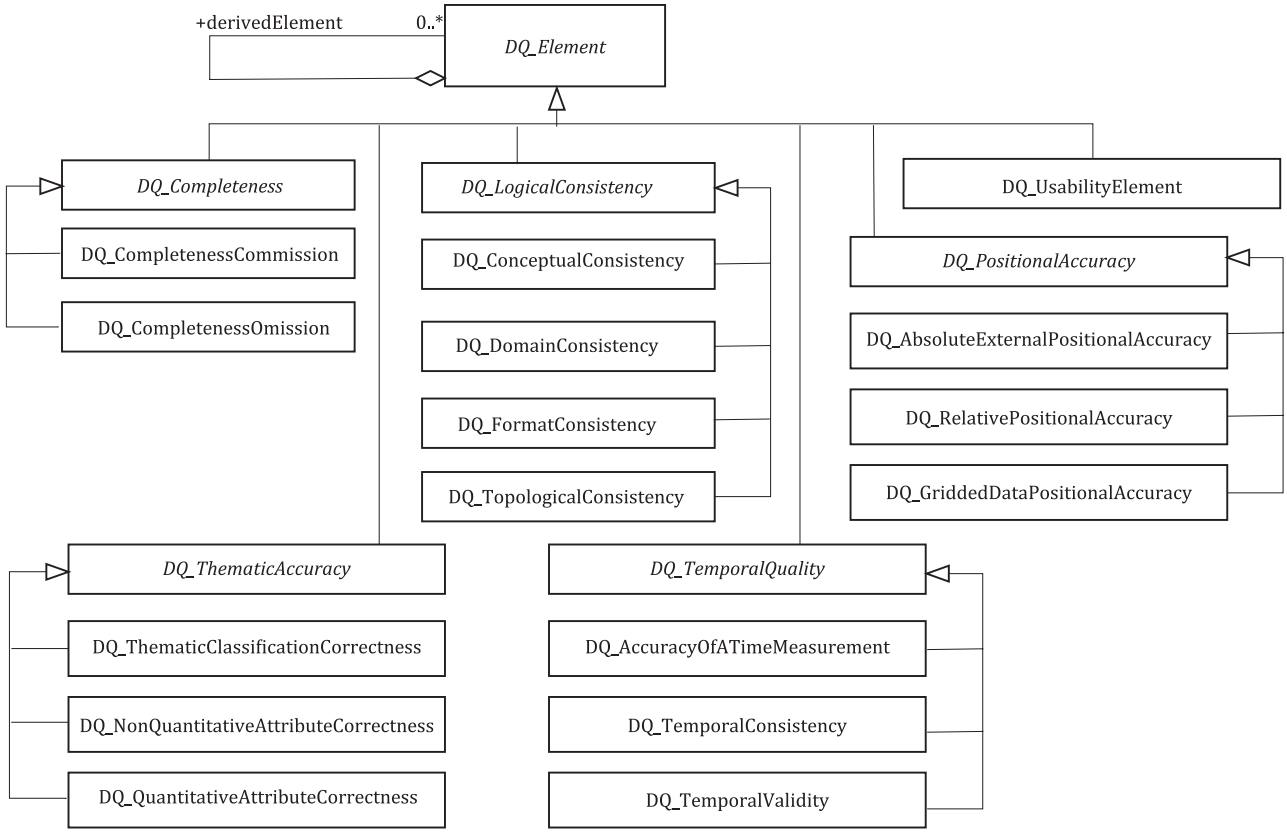

Figure 3 — Quality elements of address data (Source: ISO 19157:2013)

© ISO 2020 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19160-3:2020