ISO 19162:2019 (E)

Geographic information — Well-known text representation of coordinate reference systems

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions
3.2 Abbreviated terms

4 Conformance requirements

5 Backus-Naur Form notation and syntax

6 WKT string form

6.1 Overview
6.2 Encoding
6.3 Characters used in WKT
6.3.1 Basic characters
6.3.2 Numbers
6.3.3 Date and time
6.3.4 CRS WKT characters
6.3.5 Double quote
6.4 Delimiter
6.5 Case sensitivity
6.6 Reserved keywords
6.7 Backward compatibility

7 WKT representation of common attributes

7.1 General
7.2 Name
7.3 Scope, extent, identifier and remark
7.3.1 General
7.3.2 Usage (scope and extent)
7.3.2.1 Usage
7.3.2.2 Scope
7.3.2.3 Extent
7.3.2.3.1 General
7.3.2.3.2 Area description
7.3.2.3.3 Geographic bounding box
7.3.2.3.4 Vertical extent
7.3.2.3.5 Temporal extent
7.3.2.4 Examples of WKT describing usage
7.3.3 Identifier
7.3.4 Remark
7.4 Unit and unit conversion factor
7.4.1 Unit description
7.4.2 Conversion factor — Spatial and parametric units
7.4.3 Conversion factor — Temporal quantities
7.4.4 Default unit
7.5 Coordinate system

7.5.1 Syntax
7.5.2 Coordinate system type, dimension and coordinate data type
7.5.3 Axis name and abbreviation
7.5.4 Axis direction
7.5.5 Axis order
7.5.6 Axis unit and coordinate system unit
7.5.6.1 General
7.5.6.2 Axis unit for spatial and parametric coordinate systems
7.5.6.3 Axis unit for ordinal coordinate systems
7.5.6.4 Axis unit for temporal coordinate systems
7.5.7 Examples of WKT describing coordinate systems
7.5.7.1 Coordinate systems for geodetic CRSs
7.5.7.2 Coordinate systems for geographic CRSs
7.5.7.3 Coordinate systems for projected CRSs
7.5.7.4 Coordinate systems for vertical CRSs
7.5.7.5 Coordinate systems for engineering CRSs
7.6 Datum ensemble
7.7 Dynamic coordinate reference systems

8 WKT representation of geodetic and geographic coordinate reference systems

8.1 Overview
8.2 Geodetic reference frame (geodetic datum)
8.2.1 Ellipsoid
8.2.2 Prime meridian
8.2.3 Geodetic reference frame (datum)
8.3 Coordinate systems for geodetic and geographic CRSs
8.4 Examples of WKT describing a geodetic or geographic CRS

9 WKT representation of projected CRSs

9.1 Overview
9.2 Base CRS
9.2.1 General
9.2.2 Ellipsoidal CS unit
9.3 Map projection
9.3.1 Introduction
9.3.2 Map projection name and identifier
9.3.3 Map projection method
9.3.4 Map projection parameter
9.4 Coordinate systems for projected CRSs
9.5 Examples of WKT describing a projected CRS

10 WKT representation of vertical CRSs

10.1 Overview
10.2 Vertical reference frame (vertical datum)
10.3 Vertical coordinate system
10.4 Example of WKT describing a vertical CRS

11 WKT representation of engineering CRSs

11.1 Overview
11.2 Engineering datum
11.3 Coordinate systems for engineering CRSs
11.4 Examples of WKT describing an engineering CRS

12 WKT representation of parametric CRSs

12.1 Overview
12.2 Parametric datum
12.3 Parametric coordinate system
12.4 Example of WKT describing a parametric CRS

13 WKT representation of temporal CRSs

13.1 Temporal CRS
13.2 Temporal datum
13.3 Temporal coordinate system
13.3.1 General

13.3.2 Axis unit for temporalDateTime coordinate systems
13.3.3 Axis unit for temporalCount and temporalMeasure coordinate systems
13.4 Examples of WKT describing a temporal CRS

14 WKT representation of derived CRSs

14.1 Overview
14.2 Deriving conversion
14.2.1 General
14.2.2 Derived CRS conversion method
14.2.3 Derived CRS conversion parameter
14.2.4 Derived CRS conversion parameter file
14.2.5 Derived CRS conversion example
14.3 Derived geodetic CRS and derived geographic CRS
14.3.1 Representation
14.3.2 Example of WKT describing a derived geographic CRS
14.4 Derived projected CRS
14.4.1 Representation
14.4.2 Example of WKT describing a derived projected CRS
14.5 Derived vertical CRS
14.6 Derived engineering CRS
14.7 Derived parametric CRS
14.8 Derived temporal CRS

15 WKT representation of compound coordinate reference systems

15.1 Overview
15.2 Examples of WKT describing a compound CRS

16 WKT representation of coordinate epoch and coordinate metadata

16.1 Coordinate epoch
16.2 Coordinate metadata

17 WKT representation of coordinate transformations and coordinate conversions excluding map projections

17.1 Coordinate operations
17.2 Transformation and conversion components
17.2.1 Operation name and version
17.2.2 Source and target CRS
17.2.3 Transformation and conversion name and identifier
17.2.4 Coordinate operation method
17.2.5 Coordinate operation parameter
17.2.6 Coordinate operation parameter file
17.2.7 Interpolation CRS
17.2.8 Coordinate operation accuracy
17.2.9 Other coordinate operation attributes
17.3 Examples of WKT describing a coordinate transformation

18 WKT representation of point motion operations

19 WKT representation of concatenated coordinate operations

19.1 General
19.2 Examples of WKT describing a concatenated coordinate operation

20 WKT representation of CRS and coordinate operation couplets

20.1 Bound CRS
20.2 Bound CRS components
20.2.1 Abridged coordinate transformation
20.2.2 Coordinate operation method in abridged coordinate transformations
20.2.3 Abridged coordinate transformation parameter
20.2.4 Coordinate operation parameter file
20.3 Examples of WKT describing a bound CRS

Annex A (normative) Abstract test suite

A.1 Conformance of a WKT string describing a geodetic or geographic CRS
A.1.1 Structure

A.1.2 Content
A.2 Conformance of a WKT string describing a projected CRS
A.2.1 Structure
A.2.2 Content
A.3 Conformance of a WKT string describing a vertical CRS
A.3.1 Structure
A.3.2 Content
A.4 Conformance of a WKT string describing an engineering CRS
A.4.1 Structure
A.4.2 Content
A.5 Conformance of a WKT string describing a parametric CRS
A.5.1 Structure
A.5.2 Content
A.6 Conformance of a WKT string describing a temporal CRS
A.6.1 Structure
A.6.2 Content
A.7 Conformance of a WKT string describing a derived geodetic or derived geographic CRS
A.7.1 Structure
A.7.2 Content
A.8 Conformance of a WKT string describing a derived projected CRS
A.8.1 Structure
A.8.2 Content
A.9 Conformance of a WKT string describing a derived vertical CRS
A.9.1 Structure
A.9.2 Content
A.10 Conformance of a WKT string describing a derived engineering CRS
A.10.1 Structure
A.10.2 Content
A.11 Conformance of a WKT string describing a derived parametric CRS
A.11.1 Structure
A.11.2 Content
A.12 Conformance of a WKT string describing a derived temporal CRS
A.12.1 Structure
A.12.2 Content
A.13 Conformance of a WKT string describing a compound CRS
A.13.1 Structure
A.13.2 Content
A.14 Conformance of a WKT string describing coordinate metadata
A.14.1 Structure
A.14.2 Content
A.15 Conformance of a WKT string describing a coordinate transformation
A.15.1 Structure
A.15.2 Content
A.16 Conformance of a WKT string describing a point motion operation
A.16.1 Structure
A.16.2 Content
A.17 Conformance of a WKT string describing a concatenated coordinate operation
A.17.1 Structure
A.17.2 Content
A.18 Conformance of a WKT string describing a bound CRS
A.18.1 Structure
A.18.2 Content

Annex B (informative) Recommended practice for implementation

B.1 General
B.2 Keywords
B.2.1 Keyword case sensitivity
B.2.2 Alternative keywords
B.2.3 Handling of unrecognised keywords
B.3 Characters
B.3.1 Handling of unrecognised characters
B.3.2 String length
B.4 White space

B.4.1 Insertion of white space
B.4.2 Parsing of white space outside of quoted text
B.4.3 Parsing of white space within quoted text
B.5 Identifiers
B.5.1 Use of identifiers
B.5.2 Using names to interpret identity
B.6 Numbers
B.6.1 Precision
B.6.2 Defining parameters for a sphere
B.6.3 Implied units
B.7 Attribute order
B.8 Version of CRS WKT

Annex C (informative) Mapping of concepts from previous versions of CRS WKT

C.1 BNF
C.2 Backward compatibility of CRS common attributes
C.2.1 Name
C.2.2 ID (Authority)
C.3 Backward compatibility of coordinate reference system components
C.3.1 Ellipsoid
C.3.2 Prime meridian
C.3.3 Datum
C.3.4 Map projection
C.3.5 Coordinate system
C.4 Backward compatibility of coordinate reference systems
C.4.1 Geodetic CRS
C.4.2 Projected CRS
C.4.3 Vertical CRS and engineering (local) CRS
C.4.4 Compound CRS
C.4.5 Fitted CS
C.5 Backward compatibility of coordinate operations
C.6 Mapping of tokens and keywords from previous versions of CRS WKT to this document

Annex D (informative) Backward compatibility with ISO 19162:2015

Annex E (normative) Triaxial ellipsoid

Annex F (informative) Identifiers for coordinate operation methods and parameters

F.1 General
F.2 Map projection methods
F.3 Map projection parameters
F.4 Coordinate transformation methods
F.5 Coordinate transformation parameters

Page count: 113