

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