



SLOVENSKI STANDARD

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Inteligentni transportni sistemi - Specifikacije za izmenjavo podatkov DATEX II pri upravljanju prometa in informiranju - 5. del: Merjeni in obdelani podatki za objavo

Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 5: Measured and elaborated data publications

Intelligente Transportsysteme - DATEX II Datenaustausch Spezifikationen für Verkehrsmanagement und Verkehrsinformation - Teil 5: Gemessene und ausgearbeitete Datenveröffentlichungen

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Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 5: Measured and elaborated data publications

Intelligente Transportsysteme - DATEX II
Datenaustausch Spezifikationen für
Verkehrsmanagement und Verkehrsinformation - Teil
5: Gemessene und ausgearbeitete
Datenveröffentlichungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 278.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 16157-5:2019) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 16157-5:2014.

In comparison with the previous edition, the following technical modifications have been made:

- application of the modelling methodology,
- correction of bugs,
- addition of requested features,
- removal of redundancy between elaborated and measured data publications.

prEN 16157-5 is the fifth part of the EN 16157, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information*; the other parts are:

- *Part 1: Context and framework*;
- *Part 2: Location referencing*;
- *Part 3: Situation Publication*;
- *Part 4: Variable Message Sign (VMS) Publications* [CEN/TS];
- *Part 7: Common data elements*;
- *Part 8: Traffic management publications and extensions dedicated to the urban environment* [FprCEN/TS; currently in preparation];
- *Part 9: Traffic signal management publications dedicated to the urban environment* [FprCEN/TS; currently in preparation].

Other parts will be developed in the future.

Introduction

This European Standard defines a common set of data exchange specifications to support the vision of a seamless interoperable exchange of traffic and travel information across boundaries, including national, urban, interurban, road administrations, infrastructure providers and service providers. Standardization in this context is a vital constituent to ensure interoperability, reduction of risk, reduction of the cost base, promotion of open marketplaces and many social, economic and community benefits to be gained from more informed travellers, network managers and transport operators.

Delivering European Transport Policy in line with the White Paper issued by the European Commission requires co-ordination of traffic management and development of seamless pan European services. With the aim to support sustainable mobility in Europe, the European Commission has been supporting the development of information exchange mainly between the actors of the road traffic management domain for a number of years. In the road sector, DATEX II has been long in fruition, with the European Commission being fundamental to its development through an initial contract and subsequent co-funding through the Euro-Regional projects. With this standardization of DATEX II, there is a real basis for common exchange between the actors of the traffic and travel information sector.

This European Standard includes the framework and context for exchanges, the modelling approach, data content, data structure and relationships.

This European Standard supports a methodology that is extensible.

The fifth part of this European Standard deals with the publication sub-models within the DATEX II model that support the exchange of measured and elaborated information. These publications are intended to support the exchange of information from the organization having the measures and creating elaborated data to other organizations providing ITS services or onward information exchange. It also includes the exchange of static information about measurement sites.

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1 Scope

This European Standard (EN 16157 series) specifies and defines component facets supporting the exchange and shared use of data and information in the field of traffic and travel.

The component facets include the framework and context for exchanges, the modelling approach, data content, data structure and relationships.

This European Standard is applicable to:

- traffic and travel information which is of relevance to road networks (non-urban and urban),
- public transport information that is of direct relevance to the use of a road network (e.g. road link via train or ferry service),
- traffic and travel information in the case of cooperative intelligent transport systems (C-ITS).

This European Standard series establishes specifications for data exchange between any two instances of the following actors:

- Traffic Information Centres (TICs),
- Traffic Control Centres (TCCs),
- Service Providers (SPs).

Use of this European Standard may be applicable for use by other actors.

This European Standard covers, at least, the following types of informational content:

- Road traffic event information – planned and unplanned occurrences both on the road network and in the surrounding environment,
- Operator-initiated actions,
- Road traffic measurement data, status data and travel time data,
- Travel information relevant to road users, including weather and environmental information,
- Road traffic management information and instructions relating to use of the road network.

Part 5, i.e. this document, specifies the informational structures, relationships, association ends, attributes and associated data types required for publishing measured and elaborated data within the DATEX II framework. This is specified in three sub-models, a DATEX II measurement site table publication sub-model, a DATEX II measured data publication sub-model and a DATEX II elaborated data publication sub-model.

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.

EN 16157-1:2018, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 1: Context and framework*

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EN 16157-2, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 2: Location referencing*

EN 16157-7:2018, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 7: Common data elements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16157-1, EN 16157-7, EN 16157-2, and the following apply.

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1**elaborated data**

data which is derived/computed from one or more measurements over a period of time

Note 1 to entry: It can be a current value or a forecast value predicted from historical measurements.

3.2**measured data**

quantitative data measured against a quantified scale (possibly using standard units of measure)

Note 1 to entry: In comparison to elaborated data, measured data can be considered to represent more directly observed measurements.

3.3**measurement**

collection of quantitative data

Note 1 to entry: A measurement is made by comparing a quantity with a standard unit. Since this comparison cannot be perfect, measurements inherently include error.

3.4**measurement site**

location from where a stream of measured data can be derived

Note 1 to entry: It can be a point, a linear road section or an area. Linear sections may even be specified as itineraries or predefined location sets, e.g. for travel time routes which comprise one or more different roads.

3.5**physical quantity**

quantity used for the quantitative description of physical phenomena

3.6**site measurement**

measurement data set derived from a specific measurement site

4 Symbols and abbreviations

ANPR Automatic number plate recognition

PCU	Passenger car unit.
SCOOT	Split cycle and offset optimization technique
UML	Unified Modelling Language
XML	eXtensible Markup Language

5 Conformance

This document specifies a DATEX II measurement site table publication, a DATEX II measured data publication and a DATEX II elaborated data publication, except for these elements that relate to location information which are specified in EN 16157-2 or for the common elements (i.e. shared between several publications) which are defined in EN 16157-7.

The DATEX II platform independent data model, of which these three publication sub-models are a part, corresponds to the level A model as defined in EN 16157-1.

Conformance with this document shall require platform independent models from which platform specific models are generated to comply with the UML modelling rules defined in EN 16157-1 and with the following requirements of the sub-models which are expressed in this document:

- comply with all stipulated minimum and maximum multiplicity requirements for UML elements and relationships;
- comply with all definitions, types and ordering;
- employ optional elements as specified;
- comply with all expressed constraints.

It should be noted that conformance of a publication service with all the structural requirements stated above does not necessarily ensure that the informational content of that service will be semantically comprehensible.

6 UML notation

The UML notation used in EN 16157 (all parts) complies with ISO/IEC 19505-1. A short summary explaining the notation used in this document is provided in EN 16157-1:2018, Annex A.

7 The “RoadTrafficData” namespace

This namespace gathers all the packages and classes about the road traffic information. Figure 1 pictures the different packages and classes belonging to the “RoadTrafficData” namespace.

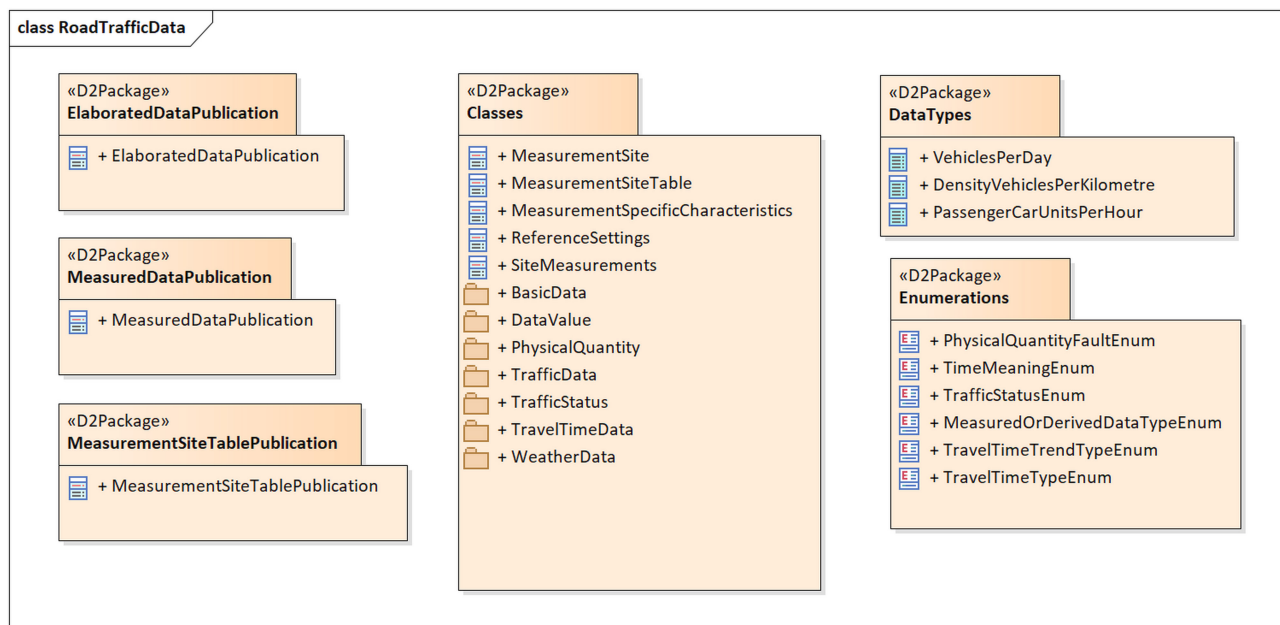


Figure 1 — The “RoadTrafficData” model

The “RoadTrafficData” namespace shall include the following 6 packages:

- ElaboratedDataPublication,
- MeasuredDataPublication,
- MeasurementSiteTablePublication,
- Classes,
- DataTypes,
- Enumerations.

The classes, attributes, data types and enumerations that are specific to this document are defined in the normative Annex A.

The XML subschema corresponding to this document is provided in the normative Annex B.

8 The measurement site table publication model

8.1 Overview of the “MeasurementSiteTablePublication” model

The “MeasurementSiteTablePublication” model comprises a top-level package, “MeasurementSiteTablePublication” which uses some classes from the “Common” package and the “LocationReference” package. This package is immediately subordinate to the “PayloadPublication” package and hence forms the top of the hierarchy of the measurement site table publication sub-model.

The “MeasurementSiteTablePublication” package delineates measurement site tables comprising a number of data sets, each describing the location from where a stream of measured data can be derived. Each location is known as a “measurement site” which can be a point, a linear road section or an area.

Each “MeasurementSiteTablePublication” class instance shall contain one or more tables pictured as instances of the “MeasurementSiteTable” class, each table containing a number of measurement sites pictured by the “MeasurementSite” class. Each instance of “MeasurementSite” shall be described by one location and specific characteristics through the class “MeasurementSpecificCharacteristics”, each instance of which describes a specific measurement like e.g. traffic flow, speed....

8.2 The “MeasurementSiteTablePublication” package

8.2.1 Overview of the “MeasurementSiteTablePublication” package

The “MeasurementSiteTablePublication” package shall comprise a sub-model for defining publishable measurement site tables which comprise records defining the measurement sites. The following Figure 2 pictures the sub-model including the relationships between classes.

Each publication may contain one or more tables, allowing logical partitioning of measurement sites information as deemed most appropriate for recipients of measured data information by the supplier (e.g. by road designation or other geographic criteria or by type of measurement site, etc.).

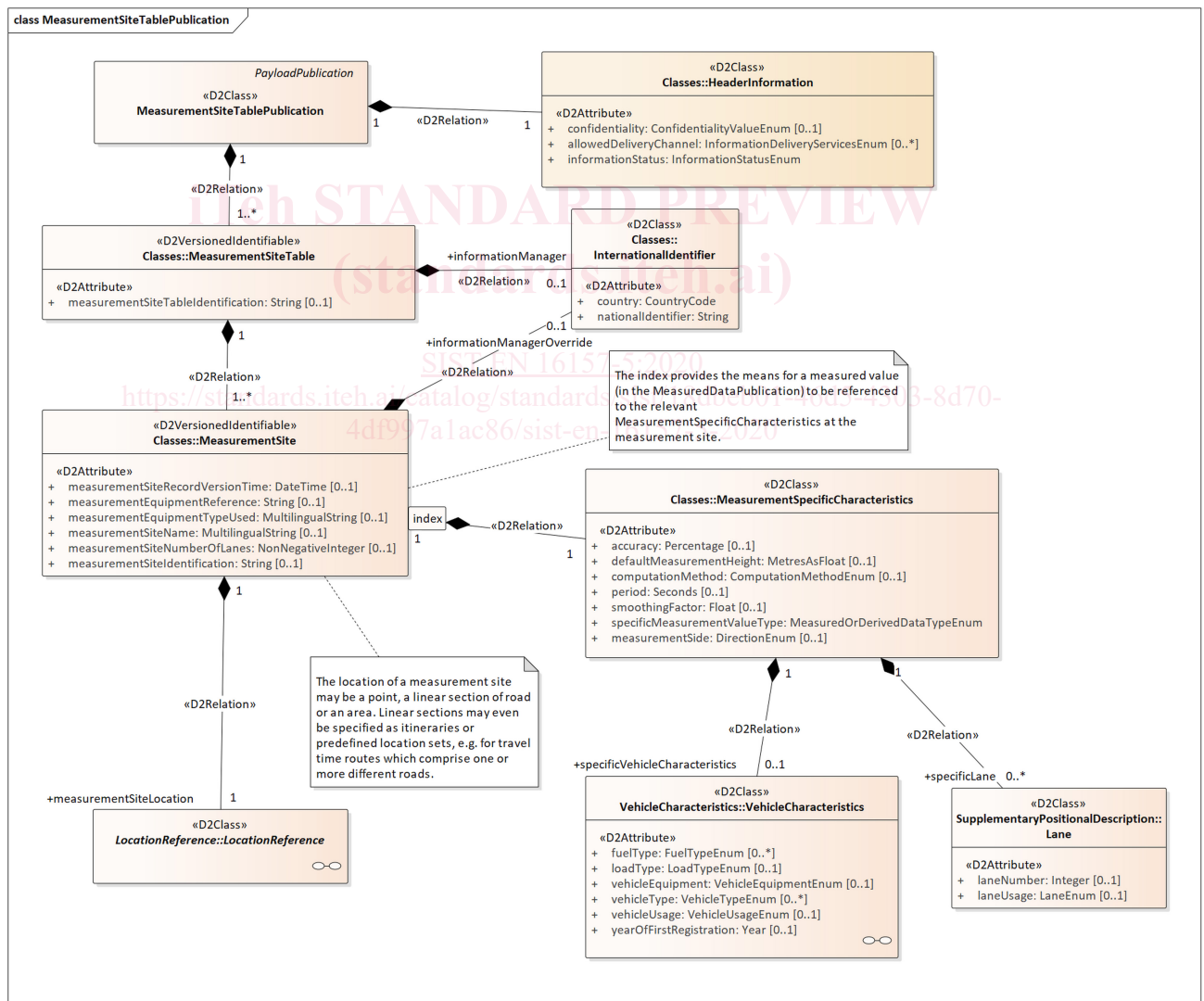


Figure 2 — The “MeasurementSiteTablePublication” package class model

prEN 16157-5:2019 (E)**8.2.2 Semantics of the “MeasurementSiteTablePublication” package****8.2.2.1 “MeasurementSiteTablePublication” class**

The “MeasurementSiteTablePublication” class is a specific realizable case of the “PayloadPublication” class. Each instance of the “MeasurementSiteTablePublication” class may contain any number of separate measurement site tables.

The “MeasurementSiteTablePublication” class is the base class for containing the published measurement site tables.

8.2.2.2 “HeaderInformation” class

Each instance of a “MeasurementSiteTablePublication” shall have associated metadata contained in an instance of the “HeaderInformation” class which allows the supplier of the measurement site table publication to specify how the recipient should handle the information contained in it. This class is defined in EN 16157-7.

8.2.2.3 “MeasurementSiteTable” class

An identifiable versioned instance of the “MeasurementSiteTable” class shall contain any logical collection of measurement sites (class “MeasurementSite”).

A “MeasurementSiteTable” class instance may be associated to an operator whose information are described with an “InternationalIdentifier” class.

8.2.2.4 “MeasurementSite” class

An identifiable versioned instance of the “MeasurementSite” class shall contain the characteristics information relating to a specific measurement site.

Each instance shall be located by using an instance of the “LocationReference” class.

Each instance shall have one indexed “MeasurementSpecificCharacteristics” sub-record for containing the characteristics of each measure individually. The index provides the means for a measured value (in the measured data publication) to be referenced to the corresponding instance of the “MeasurementSpecificCharacteristics” class at the measurement site.

A “MeasurementSite” class instance may be associated to an operator whose information is described with a “InternationalIdentifier” class.

8.2.2.5 “InternationalIdentifier” class

This class belongs to the “Common” package specified in EN 16157-7.

8.2.2.6 “LocationReference” class

Each instance of the “MeasurementSite” class shall be located by an instance of the “LocationReference” class. This class belongs to the “LocationReferencing” package specified in EN 16157-2.

8.2.2.7 “MeasurementSpecificCharacteristics” class

An instance of the “MeasurementSpecificCharacteristics” class contains characteristics which are specific to a measurement type (specified in a known order) at the given measurement site. Each measure may relate to specific vehicles which are described by the “VehicleCharacteristics” class (see 8.2.2.8), or to a specific lane which is described by the “Lane” class (see 8.2.2.9).

8.2.2.8 “VehicleCharacteristics” class

This class describes the characteristics of a vehicle, e.g. a lorry of gross weight greater than 30 tonnes. It is defined in the “VehicleCharacteristics” package specified in EN 16157-7.

8.2.2.9 “Lane” class

This class describes the characteristics of a lane. It is defined in the “SupplementaryPositionalDescription” package specified in EN 16157-2.

9 The measured data publication model

9.1 Overview of the Measured Data Publication model

The measured data publication model shall comprise a top-level package, “MeasuredDataPublication” and one sub-package “PhysicalQuantity” from the “Classes” package. The “MeasuredDataPublication” package shall be immediately subordinate to the “PayloadPublication” package and hence shall form the top of the hierarchy in the measured data publication model.

9.2 The “MeasuredDataPublication” package

9.2.1 Overview of the “MeasuredDataPublication” package

The “MeasuredDataPublication” package shall comprise the sub-model for defining a publication containing one or more measurement data sets, each set being composed of a number of measure values measured at a single measurement site.

It is pictured including the relationships between the classes in Figure 3.

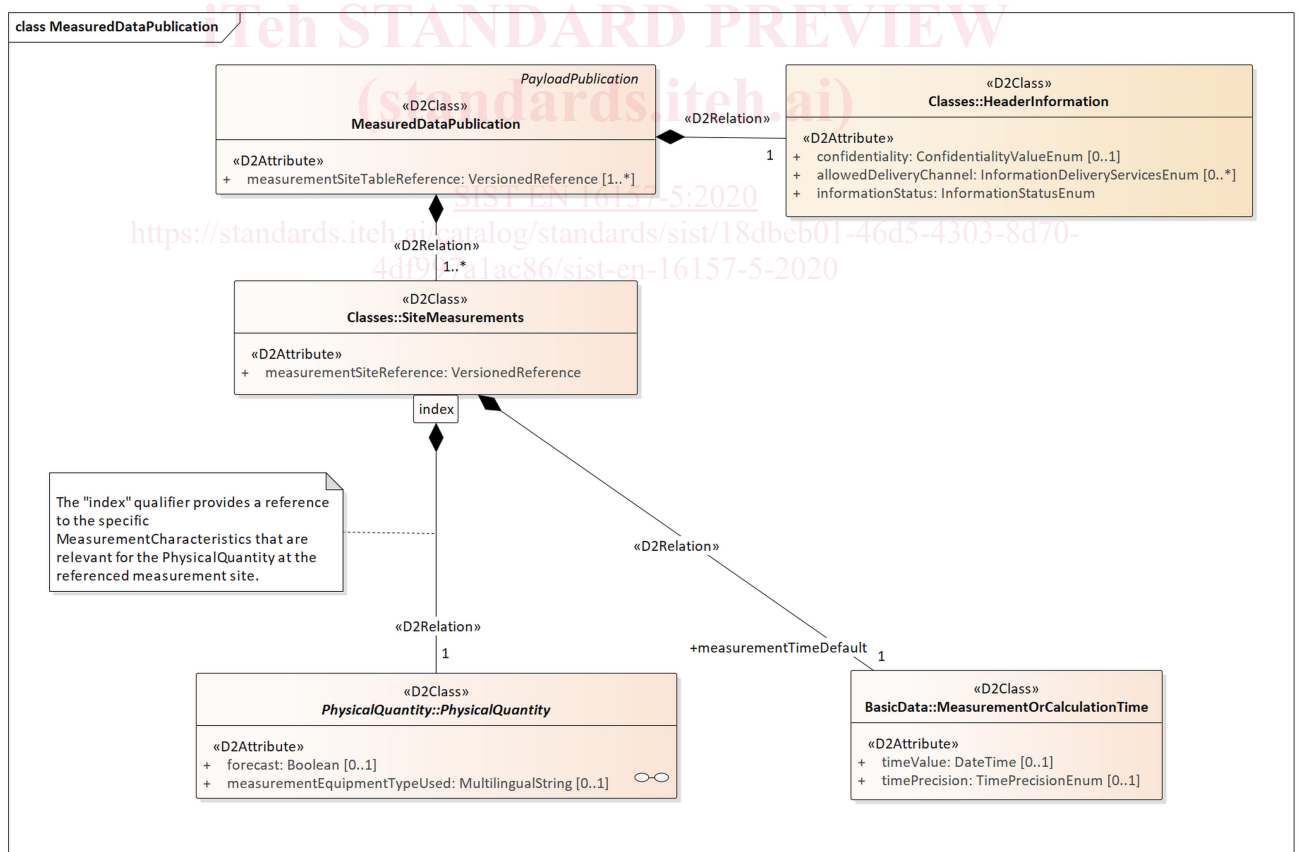


Figure 3 — The “MeasuredDataPublication” package class model