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Intelligent transport systems — Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles —

Part 3: Vehicle data

Systèmes de transport intelligents — Identification automatique des véhicules et des équipements — Identification d'enregistrement électronique (ERI) pour les véhicules —

Partie 3: Données du véhicule

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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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

This second edition cancels and replaces the first edition (ISO 2453-3:2010), which has been technically revised.

ISO 24534 consists of the following parts, under the general title *Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles*:

— *Part 1: Architecture*

— *Part 2: Operational requirements*

— *Part 3: Vehicle data*

— *Part 4: Secure communications using asymmetrical techniques*

— *Part 5: Secure communications using symmetrical techniques.*

Introduction

A quickly emerging need has been identified within administrations to improve the unique identification of vehicles for a variety of services. Situations are already occurring where manufacturers intend to fit lifetime tags to vehicles. Various governments are considering the needs and benefits of ERI, such as legal proof of vehicle identity with potential mandatory usages. There is a commercial and economic justification both in respect of tags and infrastructure that a standard enables an interoperable solution.

Electronic registration identification (ERI) is a means of uniquely identifying road vehicles. The application of ERI will offer significant benefits over existing techniques for vehicle identification. It will be an enabling technology for the future management and administration of traffic and transport including applications in free-flow, multi-lane, traffic conditions with the capability to support mobile transactions. ERI addresses the need of authorities, and other users for a trusted electronic identification, including roaming vehicles.

This part of ISO 24534 specifies the vehicle-related data that can be exchanged between an onboard electronic registration tag (ERT) and an ERI reader/writer inside or outside the vehicle. The vehicle-related data consist of the vehicle identifier and may also include additional vehicle data as typically included in a vehicle registration certificate.

This part of ISO 24534 does not provide any accurate definitions for additional vehicle data items. This is left to the local registration authorities and/or local legislation. This part of ISO 24534 only provides the means for an unambiguous exchange of vehicle parameters registered by local registration authorities.

This part of ISO 24534 makes use of the basic automatic vehicle identification (AVI) definitions in ISO 14816.

Intelligent transport systems — Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles —

Part 3: Vehicle data

1 Scope

This part of ISO 24534 provides the requirements for an electronic registration identification (ERI) that is based on an identifier assigned to a vehicle (e.g. for recognition by national authorities) suitable to be used for the following:

— electronic identification of local and foreign vehicles by national authorities;

— vehicle manufacturing, in-life-maintenance, and end-of-life identification (vehicle life cycle management);

— adaptation of vehicle data, e.g. in case of international re-sales;

— safety-related purposes;

— crime reduction;

— commercial services;

— adhering to privacy and data protection regulations.

This part of ISO 24534 defines the vehicle identification data. This data is called the ERI data and includes the following:

— the vehicle identifier;

— possible additional vehicle-related information (as typically included in a vehicle registration certificate).

All additional vehicle data elements are defined as optional. It is left to local legislation and/or the discretion of a registration authority to use or not to use a particular data element. If used, the value is assumed to be the one registered by the registration authority in accordance with local legislation. This part of ISO 24534 only provides the syntax for all these data elements.

NOTE The secure application layer interfaces for the exchange of ERI data with an ERI reader or writer are specified in ISO 24534-4 and in ISO 24534-5.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 612:1978, *Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions*

ISO 1176:1990, *Road vehicles — Masses — Vocabulary and codes*

ISO 3779, *Road vehicles — Vehicle identification number (VIN) — Content and structure*

ISO 3780, *Road vehicles — World manufacturer identifier (WMI) code*

ISO 3833, *Road vehicles — Types — Terms and definitions*

ISO/IEC 8824 (all parts), *Information technology — Abstract Syntax Notation One (ASN.1)*

ISO/IEC 8825-2:2008, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

ISO 14816, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure*

3 Terms and definitions

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

3.1
additional vehicle data
ERI data (3.5) in addition to the vehicle identifier

3.2
attribute
type (3.12) with an associated identifier

[SOURCE: ISO/IEC 8824-1:2008, Annex G.2.15.1, modified]

3.3
distinguishing identifier
information which unambiguously distinguishes an entity

[SOURCE: ISO/IEC 9798-1, 3.12, modified]

3.4
electronic registration identification
ERI
action or act of identifying a vehicle with electronic means for purposes as mentioned in the scope of this part of ISO 24534

3.5
ERI data
vehicle identifying data which can be obtained from an *ERT* (3.6)

Note 1 to entry: ERI data consist of the vehicle identifier and possible *additional vehicle data* (3.1).

3.6
electronic registration tag
ERT
onboard ERI device that contains the *ERI data* (3.5) including relevant security provisions and one or more interfaces to access that data

Note 1 to entry: In case of high security, the ERT is a secure application module (SAM).

Note 2 to entry: The ERT may be a separate device or may be integrated into an onboard device that also provides other capabilities (e.g. DSRC communications).

3.7
periodic motor vehicle test
compulsory periodic (e.g. annual) test of the roadworthiness of a motor vehicle of above a specified age or a certificate of passing such a test

EXAMPLE The MOT test in the United Kingdom is an example.

3.8
privacy
right of individuals to control or influence what information related to them may be collected and stored and by whom and to whom that information may be disclosed

[SOURCE: ISO 7498-2, 3.3.43]

Note 1 to entry: Since this term relates to the right of individuals, it cannot be very precise and its use should be avoided except as a motivation for requiring security.

3.9
registration authority
<for vehicles> authority responsible for the registration and maintenance of vehicle records

Note 1 to entry: The authority may provide vehicle records to accredited organizations.

3.10
registration authority
<for ERI data> organization responsible for writing *ERI data* (3.5) and security data according to local legislation

Note 1 to entry: The registration authority for ERI data may be the same as the *registration authority* (3.9) for vehicles. This part of ISO 24534, however, does not require this.

3.11
registration certificate
vehicle registration document (paper or smart card) issued by the *registration authority* (3.9) for vehicles in which the vehicle and its owner or lessee are registered

3.12
type
named set of values

[SOURCE: ISO/IEC 8824-1, 3.8.86]

4 Abbreviations

AEI	Automatic Equipment Identification
ASN.1	Abstract Syntax Notation One [as defined in ISO 8824 (all parts)]
AVI	Automatic Vehicle Identification
EEA	European Economic Area
EFC	Electronic Fee Collection
EN	Europäische Norm (German), English: European Standard
ENV	Europäische Norm Vorausgabe (German), English: European Pre-Standard
ERI	Electronic Registration Identification
ERT	Electronic Registration Tag
EU	European Union
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
VIN	Vehicle Identification Number

5 Requirements

5.1 Vehicle identification data

This subclause is informative only.

The secure onboard environment in which the vehicle identification data is stored is called the electronic registration tag (ERT).

Clause 5 provides an abstract definition of the ERI data to be exchanged between the ERT and an ERI reader or writer. The abstract definitions are defined using abstract syntax notation one (ASN.1) as defined in ISO 8824 (all parts).

The identifier used to identify a vehicle is called the vehicle identifier or vehicleId. The preferred vehicle identifier is the VIN that is assigned to the vehicle by its manufacturer in accordance with ISO 3779.

However, in order to make this part of ISO 24534 also applicable in countries where the VIN is not used, an alternative is also supported (see 5.2). The fundamental requirement is that the combination of a registration authority and a vehicle identifier should be globally distinguishing.

NOTE 1 As two vehicles built 30 years after each other may have the same VIN, the VIN is not 100 % unique.

NOTE 2 Empirical data has shown that a database of a registration authority may contain duplicate VIN numbers.

NOTE 3 In this part of ISO 24534, the combination of the almost unique vehicleId and a unique ERT number may be used as the unambiguous distinguishing identifier. The ERT number is a unique read-only identifier that is written into the ERT during ERT manufacturing time (see EN ISO 24534-4 and ISO 24534-5 for details).

Apart from the vehicle identifier, this part of ISO 24534 also supports the use of additional vehicle data as typically included in a vehicle registration certificate. This additional vehicle data may, for example, be used as

— additional identification information to improve the trust in a vehicle identifier, and

— certified vehicle information for other applications (e.g. for tolling to determine a tariff).

5.2 Vehicle identifier

The `VehicleId` type shall be used for the vehicle identifier according to local legislation and is defined as follows.

```
VehicleId ::= CHOICE {
          vin                         VIN,              -- preferred choice
          raSpecificVehicleId        RaSpecificVehicleId,
          …
          }
VIN ::= CS5
```

NOTE 1 The '…' at the end of the definition designates that the type `VehicleId` may be extended with additional components at the end of the type definition in new versions of this part of ISO 24534, e.g. to cope with a new VIN standard.

The vehicle identifier should be a globally distinguishing identifier.

NOTE 2 When identifying a vehicle, the ERT always delivers the `VehicleId` in combination with the identifier of the registration authority and the ERT number. The identifier of the registration authority may be used to obtain additional information about the vehicle. The ERT number is an extra unique identifier from another source that may be used to resolve potential disputes about the VIN of a vehicle.

NOTE 3 The choice of which alternative is used is outside the scope of this part of ISO 24534. It may, for example, depend on local legislation.

The VIN alternative, if used, shall be of type VIN and is the preferred vehicle identifier. The type VIN is identical to the type CS5 as defined in ISO 14816. The value of the VIN alternative shall be the value of the VIN as assigned conforming to ISO 3779 by a manufacturer or a registration authority.

The `RaSpecificVehicleId` alternative, if used, shall contain a globally distinguishing identifier for the vehicle and shall be of type raSpecificVehicleId as defined below.


```
RaSpecificVehicleId ::= SEQUENCE {
         wmi                          UTF8String (SIZE(3)),
         nonIsoStandardId             UTF8String (SIZE (1..20))
         }
```

The `wmi` component shall contain the world manufacturer identifier (WMI) code of the organization that assigned the nonIsoStandardId value and the WMI code shall be assigned to this organization according to ISO 3780.

The `nonIsoStandardId` component shall be of type `UTF8String` with a maximum length of 20 characters.

NOTE Any additional meaning conveyed in the value of a `nonIsoStandardId` component is outside the scope of this part of ISO 24534.

5.3 ERI data type

The `EriData` type shall be used for the ERI data and is defined as follows:

```
EriData ::= SEQUENCE {
        vehicleId             VehicleId,
        additionalEriData     AdditionalEriData OPTIONAL
        }
```

The `vehicleId` component shall contain the vehicle's identifier as defined in 5.2.

The `additionalEriData` component, if present, shall contain the additional ERI data.

5.4 Additional ERI data type

The type `AdditionalEriData` type is used for the additional ERI data and is defined as follows:

```
AdditionalEriData ::= CHOICE {
          additionalEriRegistrationData  AdditionalEriRegistrationData, -          -
preferred choice
          …,
          raSpecificAdditionalEriData    OCTET STRING (SIZE (0..1024))
                                          -- only to be used if
AdditionalEriRegistrationData is not supported
          }
```


The `additionalEriRegistrationData` alternative is the preferred alternative and shall be chosen whenever a value of the type `AdditionalEriRegistrationData` can be used.

The `raSpecificAdditionalEriData` alternative is of type `OCTET STRING` with a maximum length of 1 024 octets and shall only be used if a value of `additionalEriRegistrationData` cannot be used.

NOTE The '…' in the definition designates that the type `AdditionalEriData` may be extended with additional alternatives at the end of the type definition in new versions of this part of ISO 24534, e.g. to cope with a new version of the alternative `ERI registration data`.

5.5 Additional ERI registration data

5.5.1 Additional ERI registration data type

5.5.1.1 Definition of the additional ERI registration data type

The AdditionalEriRegistrationData type contains the vehicle related data typically found in a vehicle registration certificate and is defined as follows.

```
AdditionalEriRegistrationData ::= SEQUENCE {
          -- Administrative data
          registrationAuthority          RegistrationAuthority OPTIONAL,
          vehicleIdStatus                VehicleIdStatus OPTIONAL,
          dateOfFirstRegistration        DateOfFirstRegistration OPTIONAL,
          dateOfRegistration             DateOfRegistration OPTIONAL,
```

```
        validThru                       ValidThru OPTIONAL,
        chassisNumber                   ChassisNumber (SIZE (1..23))
                                        OPTIONAL,
        registrationNumber              RegistrationNumber OPTIONAL,

        -- Vehicle type
        vehicleMake                     VehicleMake OPTIONAL,
        vehicleType                     VehicleType OPTIONAL,
        vehicleTypeStatus               VehicleTypeStatus OPTIONAL,
        commercialDescription           CommercialDescription OPTIONAL,
        typeApprovalNumber              TypeApprovalNumber OPTIONAL,
        vehicleCategory                 VehicleCategory OPTIONAL,
        vehicleTaxCategory              VehicleTaxCategory OPTIONAL,
        euVehicleCategoryCode           EuVehicleCategoryCode OPTIONAL,
        raSpecificVehicleClass1        RaSpecificVehicleClass1 OPTIONAL,
        raSpecificVehicleClass2        RaSpecificVehicleClass2 OPTIONAL,
        raSpecificVehicleClass3        RaSpecificVehicleClass3 OPTIONAL,
        vehicleUse                      VehicleUse OPTIONAL,
        privateUse                      PrivateUse OPTIONAL,
        colour                          VehicleColour OPTIONAL,

        -- Vehicle shape
        length                          VehicleLength OPTIONAL,
        width                           VehicleWidth OPTIONAL,
        height                          VehicleHeight OPTIONAL,
        wheelbase                       Wheelbase OPTIONAL,
        bodyShape                       VehicleBodyShape OPTIONAL,
        euBodyWorkType                  EuBodyWorkType OPTIONAL,
        iso3833VehicleType              Iso3833VehicleType OPTIONAL,

        -- Vehicle number of passengers, axles, and mass
        numberOfSeats                   NumberOfSeats OPTIONAL, --
                                        including the driver seat
        numberOfStandingPlaces          NumberOfStandingPlaces OPTIONAL,
        maxNumberOfPassengers           MaxNumberOfPassengers OPTIONAL,
                                        -- including the driver
        unladenWeight                   UnladenWeight OPTIONAL,
        maxDesignLadenMass              MaxDesignLadenMass OPTIONAL,
        maxAuthorizedLadenMass          MaxAuthorizedLadenMass OPTIONAL,
        maxAuthorizedTrainMass          MaxAuthorizedTrainMass OPTIONAL,
        maxAuthorizedPayload            MaxAuthorizedPayload OPTIONAL,
        numberOfAxles                   NumberOfAxles OPTIONAL,
        authorizedAxleLadenMass         AuthorizedAxleLadenMass OPTIONAL,
                                        -- from front to rear axle
        maxTowableMassBrakedTrailer     MaxTowableMassBrakedTrailer
OPTIONAL,
        maxTowableMassUnbrakedTrailer MaxTowableMassUnbrakedTrailer
OPTIONAL,

        -- Vehicle engine and power source
        engineId                        EngineId (SIZE (1..60)) OPTIONAL,
        primeEngineType                 PrimeEngineType OPTIONAL,
        enginePowerSources              EnginePowerSources OPTIONAL,
        primePowerSource                PrimePowerSource OPTIONAL,
        engineMaxNetPower               EngineMaxNetPower OPTIONAL,
        engineDisplacement              EngineDisplacement OPTIONAL,
        ratedEngineSpeed                RatedEngineSpeed OPTIONAL,
        powerWeightRatio                PowerWeightRatio OPTIONAL,
        maxSpeed                        MaxSpeed OPTIONAL,
        fuelTanksCapacity               FuelTanksCapacity OPTIONAL,

        -- Environmental characteristics
        stationarySoundLevel            StationarySoundLevel OPTIONAL,
        engineSpeed                     EngineSpeed OPTIONAL,
        driveBySoundLevel               DriveBySoundLevel OPTIONAL,
```



```
          emissionCO                      EmissionCO OPTIONAL,
          emissionHC                      EmissionHC OPTIONAL,
          emissionNOx                     EmissionNOx OPTIONAL,
          emissionHCandNOx                EmissionHCandNOx OPTIONAL,
          particulatesForDiesel           ParticulatesForDiesel OPTIONAL,
          correctedAbsorptionCoefficient CorrectedAbsorptionCoefficient
OPTIONAL,
          emissionCO2                     EmissionCO2 OPTIONAL,
          combinedFuelConsumption         CombinedFuelConsumption OPTIONAL,
          environmentalCategory           EnvironmentalCategory OPTIONAL,
          euroType                        EuroType OPTIONAL,


          -- Others
          lastOfficialTestData          OfficialVehicleTestData OPTIONAL,
          …,
          raSpecificData                RaSpecificData OPTIONAL
          axlesPerAxleGroup              AxlesPerAxleGroup OPTIONAL,
                                         -- from front to rear axle group
          authorizedAxleGroupLadenMass  AuthorizedAxleGroupsLadenMass
OPTIONAL,
                                         -- from front to rear axle group


          -- ERI data used for EFC (types imported from
ElectronicRegistrationIdentificationEfcVehicleData
          efcVehicleDimensions           VehicleDimensions,
          efcPassengerCapacity           PassengerCapacity,
          efcVehicleWeightLimits         VehicleWeightLimits,
          efcAxleWeightLimits            AxleWeightLimits,
          efcVehicleSpecificCharacteristics
VehicleSpecificCharacteristics,
          efcTrailerCharacteristics      TrailerCharacteristics,
          efcEngine                      Engine,
          efcSoundLevel                  SoundLevel,
          efcCO2EmissionValue            CO2EmissionValue,
          efcExhaustEmissionValues       ExhaustEmissionValues,
          efcDieselEmissionValues        DieselEmissionValue,
          ...
          }
```


The type of the components of the `AdditionalEriRegistrationData` type is defined in 5.5 below.

NOTE 1 The '...' at the end of the `AdditionalEriRegistrationData` definition designates that the `AdditionalEriRegistrationData` type may be still extended with additional components at the end of the type definition in new versions of this part of ISO 24534.

All components are optional. Whether or not an optional component is present or absent depends on local legislation and/or the discretion of the vehicle's registration authority.

The precise meaning of a value of a component, if present, shall be determined by local legislation and/or the vehicle's registration authority and shall always take precedence over a definition in this part of ISO 24534.

NOTE 2 This part of ISO 24534 only facilitates the exchange of ERI registration data values for the purpose of vehicle identification. Both the precise definition of terms and the assignment of values in a particular state or country are outside the scope of this part of ISO 24534.

In order to maintain consistency with the vehicle's registration certificate, the value of a component, if present and applicable, should be equal to or at least as precise as the value of the corresponding data item on the vehicle's registration certificate.

5.5.1.2 Administrative data components

The `registrationAuthority` component, if present, shall identify the registration authority that registered the vehicle.

The `vehicleIdStatus` component, if present, shall specify the status of the vehicle identifier.

The vehicleIdStatus component shall not be present for a VIN-based vehicle identifier.

The dateOfFirstRegistration component, if present, shall specify the date of the first registration of the vehicle with its current registration authority.

The dateOfRegistration component, if present, shall specify the date of the registration to which this ERI data refers.

The validThru component, if present, shall specify the last day the ERI data is valid. If not present, the validity period may be assumed to be unlimited.

The chassisNumber component, if present, shall specify the chassis number of the vehicle.

The registrationNumber component, if present, shall specify the vehicle's registration number as assigned by the registration authority.

5.5.1.3 Vehicle type components

The vehicleMake component, if present, shall specify the make of the vehicle as assigned by the vehicle manufacturer.

The vehicleType component, if present, shall specify the variant, if applicable, and/or the version, if applicable, of the vehicle as assigned by the vehicle manufacturer.

The vehicleTypeStatus component, if present, shall specify the status of the vehicle type.

The commercialDescription component, if present, shall contain the commercial description(s) of the vehicle.

The typeApprovalNumber component, if present, shall specify the type-approval number.

The vehicleCategory component, if present, shall specify the vehicle category according to local legislation.

The vehicleTaxCategory component, if present, shall specify the vehicle tax category according to local legislation.

The euVehicleCategoryCode component, if present, shall specify the vehicle category according to the EU directives EU 2001/116, EU 2002/24, and UNECE 1999.

The raSpecificVehicleClass1 component, if present, shall contain a registration authority specific vehicle class, category, or code.

The raSpecificVehicleClass2 component, if present, shall contain a registration authority specific vehicle class, category, or code.

The raSpecificVehicleClass3 component, if present, shall contain a registration authority specific vehicle class, category, or code.

The vehicleUse component, if present, shall specify the use of the vehicle.

The privateUse component, if present, shall specify whether the vehicle is for private or for commercial use.

The colour component, if present, shall specify the colour of the vehicle.

5.5.1.4 Vehicle shape components

The length component, if present, shall specify the length of the vehicle.

The width component, if present, shall specify the width of the vehicle.

The height component, if present, shall specify the height of the vehicle.

The wheelbase component, if present, shall specify the wheelbase of the vehicle.

The bodyShape component, if present, shall specify the shape of the body of the vehicle.

The euBodyWorkType component, if present, shall specify the type of body work of the vehicle according to EU 2001/116.

The iso3833VehicleType component, if present, shall specify the type of the vehicle according to ISO 3833.

5.5.1.5 Vehicle number of passengers, axles, and mass components

The numberOfSeats component, if present, shall specify the number of seats including the driver seat.

The numberOfStandingPlaces component, if present, shall specify the number of standing places.

The maxNumberOfPassenger component, if present, shall specify the maximum permissible number of passengers (including the driver) that may use the vehicle.

The unladenWeight component, if present, shall specify the nominal unladen mass of the vehicle with bodywork.

The maxDesignLadenMass component, if present, shall specify the maximum technically permissible total mass of the vehicle including payload (but excluding the weight of trailers).

The maxAuthorizedLadenMass component, if present, shall specify the maximum permissible total mass of the vehicle including payload (but excluding the mass of trailers) when in service in the jurisdiction of the registration authority.

The maxAuthorizedTrainMass component, if present, shall specify the maximum permissible total mass in kilograms of the whole vehicle including payload (and including trailers and the payload of trailers) when in service in the jurisdiction of the registration authority.

The maxAuthorizedPayload component, if present, shall specify the maximum permissible payload of the vehicle (but excluding the payload of trailers).

The numberOfAxles component, if present, shall specify the number of axles of the vehicle (including lifted axles).

The axlesPerAxleGroup component, if present, shall specify the number of axles of each axle group of the vehicle (including lifted axles).

The authorizedAxleLadenMass component, if present, shall specify the maximum laden mass on each axle in kilograms.

The authorizedAxleGroupLadenMass component, if present, shall specify the maximum laden mass on each axle group in kilograms

The maxTowableMassBrakedTrailer component, if present, shall specify the technically permissible maximum braked towable mass of the trailer.

The maxTowableMassUnbrakedTrailer component, if present, shall specify the technically permissible maximum unbraked towable mass of the trailer.

5.5.1.6 Vehicle engine and power source components

The engineId component, if present, shall specify the engine identification number.

The primeEngineType component, if present, shall specify type of the prime engine of the vehicle as assigned by the manufacturer.

The enginePowerSource component, if present, shall specify the power source(s) of the vehicle.