TECHNICAL SPECIFICATION

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Automatic vehicle and equipment identification — Electronic Registration Identification (ERI) for vehicles —

Part 3:
Vehicle data

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

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 24534-3 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, and by Technical Committee CEN/TC 278, *Road transport and traffic telematics* in collaboration.

ISO/TS 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/TS 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/TS 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/TS 24534 only provides the means for an unambiguous exchange of vehicle parameters registered by local registration authorities.

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

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Automatic vehicle and equipment identification — Electronic Registration Identification (ERI) for vehicles —

Part 3:
Vehicle data

1 Scope

This part of ISO/TS 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:

— 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, and

— adhering to privacy and data protection regulations.

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

— the vehicle identifier, and

— 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/TS 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 Parts 4 and 5 of ISO/TS 24534.

2 Normative references

The following referenced documents are indispensable for the application 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 612:1978, *Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions*

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

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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 7498-2, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Part 2: Security Architecture*

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

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

ISO/IEC 9798-1, *Information technology — Security techniques — Entity authentication — Part 1: General*

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 in addition to the vehicle identifier

3.2
distinguishing identifier
information which unambiguously distinguishes an entity

[ISO/IEC 9798-1, definition 3.3.9]

3.3
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/TS 24534

3.4
ERI data
vehicle identifying data which can be obtained from an **ERT**

NOTE   ERI data consist of the vehicle identifier and possible additional vehicle data.

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

NOTE 1   In case of high security, the ERT is a secure application module (SAM).

NOTE 2   An implementer may choose also to integrate other provisions (e.g. for DSRC communications) into an ERT, as long as this does not compromise the security of the ERT.

3.6
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.

3.7
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

[ISO 7498-2, definition 3.3.43]

NOTE   Because 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.

3.8
registration authority (with respect to the ERI data)
organization responsible for writing **ERI data** and security data into an **ERT** according to local legislation

NOTE   It is expected that the registration authority with respect to the ERI data may be the same authority that keeps the official register in which the vehicle and its owner or lessee are listed. This part of ISO/TS 24534 does not require this, however.

3.9
registration certificate
vehicle registration document issued by the authority that keeps the official register in which the vehicle and its owner or lessee are listed

4   Abbreviations

4.1
AEI
Automatic Equipment Identification

4.2
ASN.1
Abstract Syntax Notation One [as defined in ISO 8824 (all parts)]

4.3
AVI
Automatic Vehicle Identification

4.4
EEA
European Economic Area

4.5
EN
Europäische Norm (German), English: European Standard

4.6
ENV
Europäische Norm Vorausgabe (German), English: European Pre-Standard

4.7
ERI
Electronic Registration Identification

4.8
ERT
Electronic Registration Tag

4.9
EU
European Union

4.10
IEC
International Electrotechnical Commission

4.11
ISO
International Organization for Standardization

4.12
VIN
Vehicle Identification Number

5 Requirements

5.1 Vehicle identification data

5.1 is informative only.

The secure onboard environment in which the vehicle identification data is stored is called the Electronic Registration Tag (ERT).

This 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/TS 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/TS 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 Parts 4 and 5 ISO/TS 24534 for details.

Apart from the vehicle identifier, this part of ISO/TS 24534 also supports the use of additional vehicle data as typically included in a vehicle registration certificate. This additional vehicle data may, e.g., 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 The 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 that location in new versions of this part of ISO/TS 24534, e.g. to cope with a new VIN standard.

The VehicleId 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/TS 24534. It may e.g. 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                          PrintableString (SIZE(3)),
        nonIsoStandardId             PrintableString (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 PrintableString 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/TS 24534.

5.3 The 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   The additional ERI data type

The type AdditionalEriData 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 1024 octets and shall only be used if a value of the type additionalEriRegistrationData cannot be used.

NOTE   The '…' in the definition designates that the type AdditionalEriData may be extended with additional alternatives at that location in new versions of this part of ISO/TS 24534, e.g. to cope with a new version of the alternative eriRegistrationData.

5.5   Additional ERI registration data

5.5.1   The Additional ERI registration data type

5.5.1.1   The 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,
```

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```
    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                          DriveBySoundLevel 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
    }
```

The type of the components of the AdditionalEriRegistrationData type is defined in the subsections of section 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 that location in new versions of this part of ISO/TS 24534.