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Personal identification — ISO-compliant driving licence —

Part 2: Machine-readable technologies

Identification des personnes — Permis de conduire conforme à l'ISO —
Partie 2: Technologies lisibles par une machine

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 document 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see http://patents.iec.ch).

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 18013-2:2008), which has been technically revised. It also incorporates the Technical Corrigendum ISO/IEC 18013-2:2008/Cor 1:2011.

The main changes compared to the previous edition are as follows:

— following the revision of ISO/IEC 18013-3 and ISO/IEC 18013-1, magnetic stripe and optical memory machine-readable technologies are no longer supported by this document;

— the vehicle categories in respect of which driving licence may be issued have been updated to incorporate the contemplated amendments to the UN Conventions;

— the restrictions which may be applicable to a driving licence have been updated.

A list of all parts in the ISO/IEC 18013 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

ISO/IEC 18013 (all parts) establishes guidelines for the design format and data content of an ISO-compliant driving licence (IDL) with regard to human-readable features (ISO/IEC 18013-1), ISO machine-readable technologies (ISO/IEC 18013-2), and access control, authentication and integrity validation (ISO/IEC 18013-3). It creates a common basis for international use and mutual recognition of the IDL without impeding individual countries/states in applying their privacy rules and national/community/regional motor vehicle authorities in taking care of their specific needs.

This document prescribes requirements for the implementation of machine-readable technology on an IDL.

One of the functions of an IDL is to facilitate international interchange. Storing IDL data in a machine-readable form supports this function by speeding up data input and eliminating transcription errors. Consequently, the automation and productivity of traffic law enforcement and other traffic safety processes can be improved.

This document allows issuing authorities to customise machine-readable data for domestic use. Apart from international interchange, the use of an IDL as a domestic driving licence thus provides for domestic standardisation and creates a domestic infrastructure capable of processing IDLs issued by other issuing authorities.

Provision is made for issuing authorities to validate the authenticity and integrity of the mandatory and optional data. In addition, the option of protecting access to optional data (beyond basic access protection) is provided for. The exact mechanism used to achieve such protection (e.g. encryption and/or additional access control) is specified in ISO/IEC 18013-3.

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Personal identification — ISO-compliant driving licence —

Part 2: Machine-readable technologies

1 Scope

The purpose of storing IDL data on machine-readable media on the IDL is to:

— increase productivity (of data and IDL use),

— facilitate electronic data exchange, and

— assist in authenticity and integrity validation.

This document thus specifies the following:

— mandatory and optional machine-readable data;

— the logical data structure;

— encoding rules for the machine-readable technologies currently supported.

To prevent unauthorised access to the data contained on a contactless IC (e.g. by eavesdropping), the privacy of the licence holder is protected via basic access protection requiring a human-readable and/or machine-readable key/password on the IDL to access the data on the PIC (via protected-channel communication). The implementation details of this function are defined in ISO/IEC 18013-3.

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.

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO/IEC 5218, *Information technology — Codes for the representation of human sexes*

ISO/IEC 7812-1, *Identification cards — Identification of issuers — Part 1: Numbering system*

ISO/IEC 7816-1, *Identification cards — Integrated circuit cards — Part 1: Cards with contacts — Physical characteristics*

ISO/IEC 7816-2, *Identification cards — Integrated circuit cards — Part 2: Cards with contacts — Dimensions and location of the contacts*

ISO/IEC 7816-3, *Identification cards — Integrated circuit cards — Part 3: Cards with contacts — Electrical interface and transmission protocols*

ISO/IEC 7816-4, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 7816-5, *Identification cards — Integrated circuit cards — Part 5: Registration of application providers*

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ISO/IEC 7816-6, *Identification cards — Integrated circuit cards — Part 6: Interindustry data elements for interchange*

ISO/IEC 7816-11:2017, *Identification cards — Integrated circuit cards — Part 11: Personal verification through biometric methods*

ISO/IEC 8825-1, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER) — Part 1*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 10918-1, *Information technology — Digital compression and coding of continuous-tone still images: Requirements and guidelines — Part 1*

ISO/IEC 14443-1, *Cards and security devices for personal identification — Contactless proximity objects — Part 1: Physical characteristics*

ISO/IEC 14443-2, *Identification cards — Contactless integrated circuit(s) cards — Proximity cards — Part 2: Radio frequency power and signal interface*

ISO/IEC 14443-3, *Cards and security devices for personal identification — Contactless proximity objects — Part 3: Initialization and anticollision*

ISO/IEC 14443-4, *Cards and security devices for personal identification — Contactless proximity objects — Part 4: Transmission protocol*

ISO/IEC 15444-1, *Information technology — JPEG 2000 image coding system: Core coding system*

ISO/IEC 15948, *Information technology — Computer graphics and image processing — Portable Network Graphics (PNG): Functional specification*

ISO/IEC 18013 (all parts), *Information technology — Personal identification — ISO-compliant driving licence*

ISO/IEC 19785-1:2015, *Information technology — Common Biometric Exchange Formats Framework — Part 1: Data element specification*

ISO/IEC 19785-3:2015, *Information technology — Common Biometric Exchange Formats Framework — Part 3: Patron format specifications*

ISO/IEC 19794-2:2005, *Information technology — Biometric data interchange formats — Part 2: Finger minutiae data*

ISO/IEC 19794-3:2006, *Information technology — Biometric data interchange formats — Part 3: Finger pattern spectral data*

ISO/IEC 19794-4:2005, *Information technology — Biometric data interchange formats — Part 4: Finger image data*

ISO/IEC 19794-5:2005, *Information technology — Biometric data interchange formats — Part 5: Face image data*

ISO/IEC 19794-6:2005, *Information technology — Biometric data interchange formats — Part 6: Iris image data*

IEC 61966-2-1, *Multimedia systems and equipment — Colour measurement and management — Part 2-1: Colour management — Default RGB colour space — sRGB*

IAFIS-IC-0110(v3), *WSQ Gray-scale Fingerprint Image Compression Specification*, Federal Bureau of Investigation, Criminal Justice Information Services Division (1997)

ICAO Doc 9303, *Machine Readable Travel Documents*, Seventh Edition 2015

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3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 18013-1 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
basic access protection
BAP
protection method requiring a human-readable and/or machine-readable key/password on the IDL to access the data on the secure IC via protected-channel communication

3.1.2
binary coded decimal
BCD
binary coding of a sequence of integers using 4 bits for each integer (where the bit weights are 8421) and encoding two integers per byte, and where a 0 digit is appended to the left of an integer sequence containing an uneven number of digits before encoding

Note 1 to entry: Only unsigned BCD is used in this document.

Note 2 to entry: For purposes of this document, the definition of numeric characters in ISO/IEC 18013-1 in terms of ISO/IEC 8859-1 is deemed to be for identification purposes of the numeric characters only, and does not pertain to the manner in which numeric characters have to be encoded. Encoding rules are explicitly specified in this document.

EXAMPLE See Table 1.

Table 1 — BCD examples

Integer	BCD
5	0000 0101
20	0010 0000
387	0000 0011 1000 0111

3.1.3
biometric data block
BDB
block of data with a defined format that contains one or more biometric samples or *biometric templates* (3.1.5)

3.1.4
biometric information record
BIR
BioAPI Consortium Patron Format biometric record header

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3.1.5
biometric template
biometric sample (i.e. information obtained from a biometric device, either directly or after further processing) or combination of biometric samples that is suitable for storage as a reference for future comparison

Note 1 to entry: This definition is an expansion of a definition in ISO/IEC 19785-1:2015.

3.1.6
card holder
person using an IDL, who is not necessarily the legitimate licence holder

3.1.7
common biometric exchange file format
CBEFF
file format that promotes interoperability of biometric-based applications and systems by specifying a standard structure for a *BIR* (3.1.4) and a set of abstract data elements and values that can be used to create the header part of a CBEFF-compliant BIR

Note 1 to entry: This definition is based on descriptive language in ISO/IEC 19785-1:2015.

3.1.8
compact encoding
encoding method when the memory capacity available for the IDL application does not exceed 5 kB, typically applicable to 2D bar code symbologies, *RFID* (3.1.13) and limited memory-capacity ICs (PICs and ICs with contacts)

Note 1 to entry: Compact encoding generates one constructed data object containing all *data groups* (3.1.9). Selective reading is not possible and the read device reads all data at the same time, where after the data is parsed. Using this method for machine-readable technologies with large memory capacity is not recommended as it can result in prolonged reading time.

Note 2 to entry: Compact encoding may also be used where the total memory capacity exceeds 5 kB (e.g. ICs with contacts and PICs) but where the capacity available to the IDL application is limited due to capacity being reserved for other applications.

3.1.9
data group
DG
collection of related data elements

3.1.10
delimiter
D
character used to separate data elements in a machine-readable data stream

3.1.10.1
data group delimiter
multiplication sign "×"

Note 1 to entry: Character D7 of ISO/IEC 8859-1.

3.1.10.2
field delimiter
division sign "÷"

Note 1 to entry: Character F7 of ISO/IEC 8859-1.

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3.1.10.3
sub-field delimiter
sub-delimiter
semicolon ";"

Note 1 to entry: Character 3B of ISO/IEC 8859-1.

3.1.10.4
end of file delimiter
pilcrow "¶"

Note 1 to entry: Character B6 of ISO/IEC 8859-1.

3.1.11
digital signature
data appended to, or cryptographic transformation of, a data string that proves the origin and the integrity of the data string and protects against forgery, e.g. by the recipient of the data string

3.1.12
standard encoding
encoding method when the memory capacity available for the IDL application exceeds 5 kB, typically applicable to ICs (PICs and ICs with contacts)

3.1.13
radio-frequency identification
RFID
ISO/IEC 14443-compliant IC designed primarily for data storage

3.2 Abbreviated terms

DF	dedicated file
EF	elementary file
F	fixed length field
IC	integrated circuit
ICC	integrated circuit card
LDS	logical data structure
MF	master file
PIC	proximity integrated circuit
PICC	proximity integrated circuit card
V	variable length field

4 Conformance

A driving licence is in conformance with this document if it meets all mandatory requirements specified directly or by reference herein. Compliance with ISO/IEC 18013-1 is not required for compliance with this document, except for those parts of ISO/IEC 18013-1 directly referenced in this document outside of Clause 3. Conversely, the incorporation of a machine-readable technology which is not compliant with this document does not necessarily render the IDL non-compliant with ISO/IEC 18013-1.

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5 Machine-readable functionality of IDLs

5.1 Overview

The subclauses that follow specify the functions (mandatory and optional) to be supported by any machine-readable data elements used on an IDL. The optional domestic data elements incorporated at the discretion of an issuing authority may support additional functions than those specified below.

5.2 General principles

The use of machine-readable functionality in IDLs is optional. If used, all the data elements identified in ISO/IEC 18013-1 as mandatory for international interchange, except for the signature and portrait of the licence holder, shall be included in the machine-readable data. The machine-readable data elements may also include any other data/information that appears visually on the IDL (such as the identification of the issuing country), as well as additional data elements not reflected visually on the IDL. No machine-readable data/information shall conflict with the human-readable data/information. Machine-readable data elements shall, except for optional domestic data (see 8.9), have the exact same meaning as the human-readable data elements on the IDL.

NOTE A conflict between human-readable data elements and machine-readable data elements can cast suspicion upon the licence holder.

Rewriting, updating and appending functions may be supported to the extent allowed by the technology (or technologies) used. If implemented, such functions shall comply with the principles set out herein. Security options are established to support authenticity and integrity of machine-readable data.

It shall be possible to read mandatory data without restriction (with the exception of basic access protection in the case of a PIC IDL). Optional data may be protected, in which case the protection mechanism (and associated parameters) shall be noted or referenced. The various protection mechanisms are specified in ISO/IEC 18013-3. The optional domestic data may be protected in any manner without restriction.

Changes to machine-readable data elements by the issuing authority are allowed only to data-elements that do not appear in human-readable format on the IDL. Issuing authorities shall uniquely identify each new version (see 8.4) of optional machine-readable data (typically after changing the originally recorded optional data). Issuing authorities shall issue a new IDL when changes to machine-readable data elements will lead to inconsistencies with human-readable data elements on the IDL.

5.3 Mandatory functions

5.3.1 General

Machine-readable data elements included on an IDL shall support/enable the functions described in the following subclauses.

5.3.2 Privilege to drive at time of licensing

Using the IDL to determine (from machine-readable data elements) the driving privileges [and associated restrictions, conditions and validity period(s)] granted to the licence holder by the issuing authority identified on the IDL. It is recognized that this information does not confirm that the issuing authority presently (i.e. at the time when the machine-readable data on an IDL is read by an entity trying to establish a licence holder's driving privileges) considers the licence holder's driving privileges to be valid.

5.3.3 Reference to driving privilege database

Using the machine-readable data elements (such as the licence number) on the IDL to reference records of driving privileges maintained by the issuing authority.

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5.3.4 Age verification

Using the machine-readable data elements on the IDL to assure that the licence holder meets various age thresholds for certain products and services, including driving privileges (in the case where the age threshold to drive a particular category of vehicle domestically in the issuing country is lower than the age permitted internationally).

5.4 Optional functions

5.4.1 Identity verification

Using the machine-readable data elements on the IDL to confirm, by way of a visual comparison of the portrait image, that the card holder is the licence holder.

5.4.2 Biographical data verification

Using the machine-readable data elements on the IDL to confirm, by way of visual inspection of the biographical data printed on the portrait side of the card, that such data have not been altered.

5.4.3 Evidence of residence

Ability to use the IDL as evidence that the licence holder resided at a specific location at the time the IDL was issued. It is recognized that this information does not confirm that the issuing authority presently considers the licence holder's residential information to be correct.

5.4.4 Biometric authentication

Ability to use a machine-readable biometric template or templates on the IDL to determine whether the card holder is the licence holder by means of a machine-assisted biometric verification process (i.e. a one-to-one match).

5.4.5 Reciprocity of driving privileges

Ability for a country other than the issuing country to use the machine-readable data elements on the IDL to establish whether a mutual recognition agreement (or agreements) exists with the issuing authority.

5.4.6 Document authentication and validation

Ability to reference items on or qualities about the IDL to verify the document is authentic (i.e. produced by the issuing authority reflected both in the human- and machine-readable data) and that no data has been altered since issuing.

6 Machine-readable technologies supported

Technologies suitable for both compact encoding and standard encoding are supported.

For compact encoding, a typical minimum capacity of 300 usable bytes is required.

Given the minimum data capacity needed to support the mandatory data requirements, the IDL may contain any or a combination of the following machine-readable technologies:

— RFID — Compact encoding, specified in Annex B.

— Two-dimensional bar code — Compact encoding, specified in Annex B.

— IC with contacts — Standard encoding, specified in Annex C (failing which, compact encoding only if limited memory capacity is available for the IDL application, specified in Annex B).

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— PIC — Standard encoding, specified in Annex C (failing which, compact encoding only if limited memory capacity is available for the IDL application, specified in Annex B).

7 Organization of data

7.1 Overview

Data is organized into fourteen data groups, of which each contains data pertaining to a similar function. One data group is mandatory and the others are optional. One data group is reserved for future use.

NOTE Whether or not each group (or individual data element) can be accessed individually depends on the machine-readable technology used.

7.2 Mandatory data

Mandatory data is comprised of the minimum set of data elements required for international interchange (as defined in ISO/IEC 18013-1), with the exception of the signature and portrait.

7.3 Optional data

Optional data is organized into the following groups — licence holder details (DG 2), issuing authority details (DG 3), portrait image (DG 4), signature/usual mark image (DG 5), facial biometric template (DG 6), fingerprint biometric template (DG 7), iris biometric template (DG 8), domestic data (DG 11), non-match alert (DG 12), active authentication (DG 13) and extended access control (DG 14). Provision is also made for another as yet undefined biometric template (DG 9), and an additional group reserved for future use (DG 10).

8 Data structure

8.1 Conceptualisation

Details of the data structure vary depending upon the storage technology(s) used. Conceptually the structure can be visualized as depicted in Figure 1.

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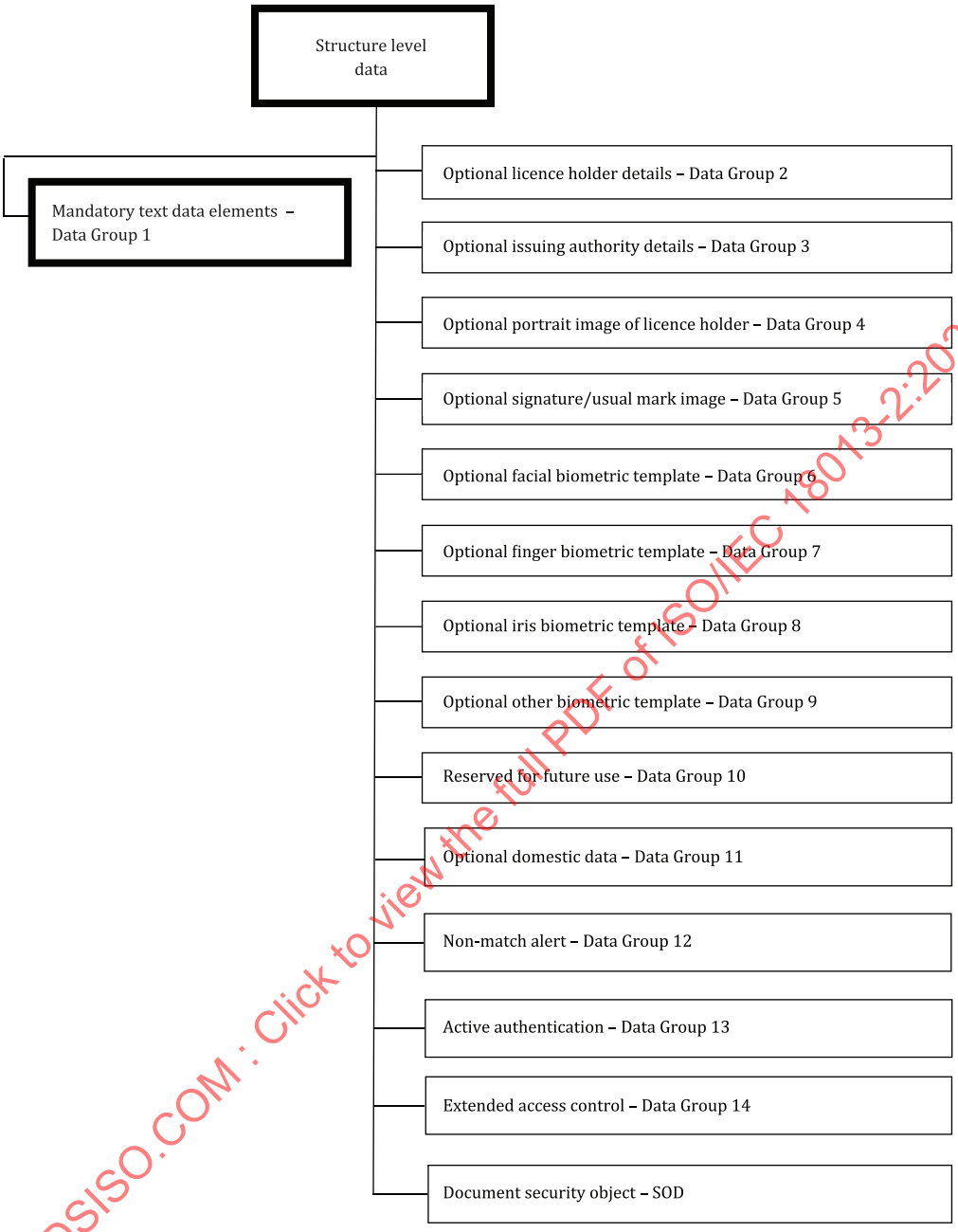

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NOTE This is only a graphical representation. The actual data mapping for each of the machine-readable technologies is specified in the annexes.

Figure 1 — Conceptual data structure

Data groups 12 to 14 and the document security object are applicable specifically to access control, authentication and integrity validation and are thus specified in ISO/IEC 18013-3.

8.2 Data Group 1: mandatory text data elements

Data Group 1 consists of nine mandatory elements — demographic data and endorsement/restriction information. See Table 2.

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Table 2 — Data Group 1, mandatory text data elements

Name	Fixed or variable	Field format/length/type	Example
Family name	V	36AS	Smithe-Williams
Given[a] names	V	36AS	Alexander George Thomas
Date of birth (yyyymmdd)	F	8N	19700301
Date of issue (same format as Date of Birth)	F	8N	20020915
Date of expiry (same format as Date of Birth)	F	8N	20070930
Issuing country (shall be in accordance with ISO 3166-1)	F	3A	JPN
Issuing authority	V	65ANS	HOKKAIDO PREFECTURAL PUBLIC SAFETY COMMISSION
Licence number	V	25AN	A29065439516427 3X
Categories of vehicles/ restrictions/conditions (shall comply with the field assembly rules specified in Annex A)	V	ADNS (also specified in Annex A)	C1;20000315;20100314;93;<=;8000

NOTE 1 Note the difference between the issuing country code specified in ISO 3166-1, and the issuing country code appearing in Zone I of an IDL as specified in ISO/IEC 18013-1:2018, Annex F.

NOTE 2 Field format/length/type refers to status before encoding.

[a] No titles and/or suffixes shall be included.

The assembly of the categories of vehicles/restrictions/conditions field shall comply with Annex A. Encoding specifics vary slightly depending upon the technology mapping employed and is specified in Annexes B and C in accordance with the machine-readable medium included on the card. The following general format (repeated as necessary) is adhered to:

[category] ; [issue date] ; [expiry date] ; [restriction/condition code] ; [restriction/condition sign] ; [restriction/condition value]

NOTE Spaces (periods) have been inserted before and after the sub-field delimiter above for ease of reading only.

8.3 Data Group 2: optional licence holder details

Data Group 2 consists of seven optional data elements that provide supplemental descriptive information. Any or all data elements may be present for a particular implementation. See Table 3.

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Table 3 — Data Group 2, optional licence holder details

Name	Fixed or variable	Field format/length/type	Example
Gender (shall be in accordance with ISO/IEC 5218)	F	1N	1 (Male = 1, Female = 2)
Height (cm)	F	3N	172
Weight (kg)	F	3N	082
Eye colour[a]	F	3A	BLU
Hair colour[b]	F	3A	BAL
Place of birth	V	35ADNS[c]	Frozen Foot;Minnesota;USA
Permanent place of residence	V	113ADNS[d]	471 Monica Road;201 Delta Building;Lynnwood;Gauteng;0186;-South Africa

NOTE 1 ISO/IEC 18013-1 allows non-metric units to be used for the height and weight values that may appear in Zone II of an IDL.

NOTE 2 Field format/length/type refers to status before encoding.

[a] Eye colour options are BLK = Black, BLU = Blue, BRO = Brown, DIC = Dichromatic, GRY = Grey, GRN = Green, HAZ = Hazel, MAR = Maroon, PNK = Pink, UNK = Unknown

[b] Hair colour options are BAL = Bald, BLK = Black, BLN = Blond, BRO = Brown, GRY = Grey, RED = Red/Auburn, SDY = Sandy, WHI = White, UNK = Unknown

[c] Three fields delimited by the sub-field delimiter — City; State/Province or District; Country. Addresses that cannot be expressed in the defined character set shall be transliterated.

[d] Six fields delimited by the sub-field delimiter — Street address line 1 (e.g. street name and number); Street address line 2 (e.g. apartment number); City; State/Province or District; Postal Code; Country. Addresses that cannot be expressed in the defined character set shall be transliterated.

8.4 Data Group 3: optional issuing authority details

Data Group 3 consists of four optional data elements that can provide additional details about the IDL or issuing authority. None or all data elements need to be present for a given implementation. See Table 4.

Table 4 — Data Group 3, optional issuing authority details

Name	Fixed or variable	Field format/length/type	Example
Administrative number	V	25ANS	123456789B
Document discriminator[a]	F	2N	01
Data discriminator[b]	F	2N	01
ISO issuer ID number[c] (shall be in accordance with ISO/IEC 7812-1)	F	8N	63600000

NOTE Field format/length/type refers to status before encoding.

[a] Number assigned by the issuing authority to differentiate between additional licences (documents) or duplicate documents issued bearing the same licence number as the original, that is 01 for the original licence, 02 for the first duplicate, 03 for the second duplicate and nn for the (nn-1)th duplicate.

[b] Number assigned by the issuing authority to differentiate between machine-readable data sets on the same physical document where updates have been made to machine-readable data, that is 01 for the original data set, 02 for the first update, 03 for the second update and nn for the (nn-1)th update. The data discriminator is mandatory when any change is made to the machine-readable data (see 5.2).

[c] ISO number assigned to issuing country or licensing authority, as the case may be.

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8.5 Data Group 4: optional portrait image

Data Group 4 is comprised of one or more portrait images of the licence holder. The portrait images shall comply with Annex D. An image visually similar to the image printed on the portrait side of the IDL shall be included. See Table 5.

Table 5 — Data Group 4, optional portrait image

Name	Fixed or variable	Field format/length/type
Portrait image timestamp[a]	F	14N yyyymmddhhmmss where yyyy=year, mm=month, dd=day, hh=hour, mm=minute, ss=second If hour, minute, and second are not available, 00 shall be used for each value.
Type of image	F	1N 3 = JPEG; 4 = JPEG2000
Portrait image	V	JPEG shall be in accordance with ISO/IEC 10918-1, JPEG-2000 shall be in accordance with ISO/IEC 15444-1, as specified in Annex D.

NOTE 1 Issuing authorities may include a portrait image in a facial biometric data block in lieu of including such image in DG 4 (in standard encoding). Consequently, card-reading applications should test for the presence of a portrait image in DG 6.

NOTE 2 Image length may be specified by the encoding scheme.

NOTE 3 Field format/length/type refers to status before encoding.

[a] Used to date the appearance of the licence holder (as reflected on the portrait image). The timestamp reflects the date and time the picture was taken (which is not necessarily the same as the time and date that the physical image data file was created). Mandatory if more than one portrait image is included.

8.6 Data Group 5: optional signature/usual mark image

Data Group 5 specifies encoding of the licence holder's signature or usual mark (as specified in Annex D). Since it is an image, signatures or usual marks using non-Latin characters are possible. See Table 6.

Table 6 — Data Group 5, optional signature/usual mark image

Name	Fixed or variable	Field format/length/type
Type of image	F	1N 3 = JPEG; 4 = JPEG2000; 5 = PNG
Image of signature or mark	V	JPEG shall be in accordance with ISO/IEC 10918-1, JPEG-2000 shall be in accordance with ISO/IEC 15444-1, PNG shall be in accordance with ISO/IEC 15948, as specified in Annex D.

NOTE 1 Image length can be specified by the encoding scheme.

NOTE 2 Field format/length/type refers to status before encoding.

8.7 Data groups 6, 7, 8 and 9: optional facial, fingerprint, iris and other biometric templates

Any biometric template is encoded based on the "ISO/IEC JTC 1/SC 37 TLV-encoded patron format, for use with smartcards or other tokens" patron format, which shall be as specified in ISO/IEC 19785-3:2015, Clause 11, specifically the off-card matching implementation specified in ISO/IEC 19785-3:2015, 11.2, as amended in Table 7. This format uses the CBEFF structure.

Multiple biometric templates may be stored. If more than one is stored, the most recent biometric shall be identified as such by supplying the BDB creation date and time.

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Use of the CBEFF format to sign and/or encrypt individual BDBs falls outside the scope of this document. Use of the access control and authentication features defined in ISO/IEC 18013-3 is preferred.

Table 7 — Data Group 6 to 9, optional biometric information

Name	Fixed or variable	Field format/ length/type encoding	Presence	Example
Entry count	V	Binary representation	Mandatory when more than one BDB is present	'01' for the first entry, '02' for the second entry, the highest numbered entry being the most recent.
For each entry				
Name	Fixed or variable	Field format/ length/type encoding	Presence	Example
Patron header version	F	2 bytes, '01 01'	Mandatory (if absent, the default value applies)	'01 01'
Biometric type	V	1 to 3 bytes ISO/IEC 19785-3:2015, Table 11.5 shall apply	Optional	Facial = '02' Finger = '08' Iris = '10'
Biometric subtype	F	1 byte ISO/IEC 19785-3:2015, Table 11.6 shall apply	Mandatory when biometric subtype is applicable but not specified in BDB	binary xx100101 for right hand thumb (given a biometric type of '08') binary xx100010 for left eye (given a biometric type of '10')
Biometric data creation date and time (yyyymmddhhmmss)[a]	F	14BCD	Mandatory when more than one BDB is present	'20 03 12 15 17 35 30', representing December 15, 2003, 5:35:30 PM. Using BCD representation this is coded using 7 bytes.
BIR creator	V	Encoded ANS shall be in accordance with ISO/IEC 8859-1	Optional	Hokkaido Prefectural Public Safety Commission (before encoding)
BDB validity period (yyyymmddyyyymmdd)[b]	F	16BCD	Optional	'20 03 12 15 20 08 12 14', representing a validity period from December 15, 2003 to December 14, 2008. Using BCD representation this is coded using 8 bytes.

NOTE Field format/length/type refers to status after encoding.

[a] If hour, minute, second are not available, 00 shall be used for each value.

[b] Two concatenated dates where the first date is the "from date" (not after), and the second date is the "to date" (not before).

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Table 7 *(continued)*

	Name	Fixed or variable	Field format/ length/type encoding	Presence	Example
	For each entry				
	BDB product owner, product type	F	4 bytes (a concatenation of two 16 bit positive integers of value 1 to 65 535) ISO/IEC 19785-1:2015, 6.5.12 and 6.5.13 and ISO/IEC 19785-3:2015, Table 11.4 shall apply	Optional	'00 01 00 82'
	BDB format owner	F	2 byte non-negative integer of value 1 to 65 535 ISO/IEC 19785-1:2015, 6.5.1 shall apply	Mandatory	'01 01' for ISO/IEC JTC 1/ SC 37, *Biometrics*
	BDB format type	F	2 byte non-negative integer of value 1 to 65 535 ISO/IEC 19785-1:2015, 6.5.2 shall apply	Mandatory	'00 09' for ISO/IEC JTC 1/ SC 37's iris image format
	BIR index (unique identifier used to reference the biometric data set in an application context outside the IDL)	V	Free format	Optional	RecId_1952686A67
	Biometric data block	V	Format and encoding as specified by BDB format owner and type.	Mandatory	Finger minutia record as specified in ISO/IEC 19794-2:2005, Clause 7
	BIR payload	V	ISO/IEC 19785-1:2015, 6.5.22 shall apply	Optional	Arbitrary domestic data

NOTE Field format/length/type refers to status after encoding.

[a] If hour, minute, second are not available, 00 shall be used for each value.

[b] Two concatenated dates where the first date is the "from date" (not after), and the second date is the "to date" (not before).

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8.8 Data Group 10: reserved for future use

Data Group 10 is reserved for future use.

8.9 Data Group 11: optional domestic data

Since Data Group 11 is dedicated for domestic (or regional) use, the contents shall be defined by the issuing authority (or supranational entity) consistent with the structure, format and principles embodied in the definition of the other data groups.

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9 Application identifiers

All applications specified in this document (including other parts of the ISO/IEC 18013 series) are identified by a seven byte Application Identifier (AID). The AID consists of a five byte Registered Application Identifier (RID) and a two byte Proprietary Application Identifier Extension (PIX).

The RID for the *International Interchange Driving Licence Application* is 'A0 00 00 02 48'.

NOTE 1 The RID was assigned by ISO/IEC JTC 1/SC 17/WG 5 in accordance with ISO/IEC 7816-5.

NOTE 2 Pairs of single apostrophes are used to indicate hexadecimal notation and are not encoded.

The PIX for each of the applications involved is shown in Table 8.

Table 8 — Proprietary Application Identifier Extensions

Application	PIX
Application 1: Compact encoding (all technologies excluding ICs)	'01 00'
Application 2: Standard encoding for ICs	'02 00'
Application 3: Compact encoding for ICs	'03 00'

Issuing authorities may add additional applications to the IDL. Issuing authorities may either use the range of PIXs allocated for this purpose ('05 00' to '05 FF') or obtain separate RIDs from the Registration Management Group of SC 17/WG5 according to the procedures defined in ISO/IEC 7816-5 for such applications.

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Annex A
(normative)

Assembly rules for categories of vehicles/restrictions/conditions field

A.1 General

This annex contains the assembly rules for the categories of vehicles/restrictions/conditions field as defined in Table 2. The assembly rules include coding systems for vehicle categories (as defined in ISO/IEC 18013-1) and vehicle and driver restrictions and conditions. The use of codes facilitates language-independent implementation.

A.2 Scope

In addition to specifying the logical record format for the electronic storage of the categories of vehicles/restrictions/conditions field, this annex also defines the codes necessary for international interchange (machine-readable data corresponds to human-readable data) in respect of the following:

— any vehicle subcategory defined in accordance with ISO/IEC 18013-1:2018, Annex B;

— supplementation of defined vehicle subcategories in accordance with ISO/IEC 18013-1:2018, Annex B;

— vehicle restriction definitions in ISO/IEC 18013-1:2018, Annex B;

— driver restriction definitions in ISO/IEC 18013-1:2018, Annex B.

The above-mentioned definitions may be expanded upon for domestic purposes by adding the following optional restrictions in Data Group 11:

— vehicle restrictions in addition to the mandatory definitions in ISO/IEC 18013-1:2018, Annex B;

— driver restrictions in addition to the mandatory definitions in ISO/IEC 18013-1:2018, Annex B.

A.3 Logical record format

The categories of vehicles/restrictions/conditions field consists of one or more instances of the category of vehicle/restriction/condition data object. The category of vehicle/restriction/condition data object is assembled as illustrated in Figure A.1.

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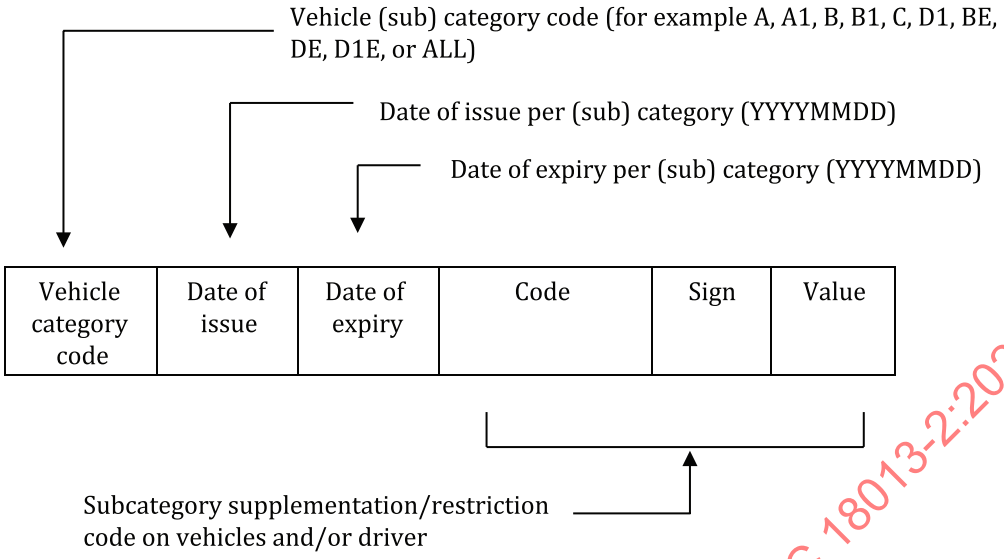

Figure A.1 — Structure of the category of vehicle/restriction/condition data object

Each data block in Figure A.1 is separated by a sub-field delimiter. Each instance of a vehicle category is followed by 5 data fields.

NOTE The number of sub-fields in the categories of vehicles/restrictions/conditions field thus always will be a multiple of 6.

The category of vehicle/restriction/condition data object is repeated as necessary to explain all the categories of vehicles/restrictions/conditions applicable to the licence holder. The manner in which multiple instances of the category of vehicle/restriction/condition data object is encoded is specified in the corresponding specification for compact encoding or standards encoding in Annex B or Annex C respectively.

For encoding purposes, the formatting of the fields comprising the categories of vehicles/restrictions/conditions field is defined in Table A.1.

Table A.1 — Field formatting

Field	Fixed or variable	Field format/length/type (before encoding)
Vehicle category code	V	AN
Date of issue	F	8N
Date of expiry	F	8N
Code	V	ANS
Sign	V	S
Value	V	ANS

When a category of vehicle/restriction/condition data object is encoded (e.g. in accordance with Annex C), each field making up the data object shall be encoded individually as specified in the corresponding specification defined in Annex B or Annex C).

EXAMPLE For compact encoding (as specified in Annex B), the various fields (and the delimiters) will be encoded as shown in Table A.2.

Table A.2 — Field formatting

Field	Encoding method
Vehicle category code	As per ISO/IEC 8859-1

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Table A.2 *(continued)*

Field	Encoding method
Date of issue	BCD
Date of expiry	BCD
Code	As per ISO/IEC 8859-1
Sign	As per ISO/IEC 8859-1
Value	As per ISO/IEC 8859-1
Delimiters	As per ISO/IEC 8859-1

A.4 Codes

A.4.1 International interchange

The codes defined below in this clause shall be used for international interchange (in DG 1).

Each code is of the format nn or Snn where "n" is a numeric.

The codes defined in this annex are used in the following manner:

— on its own, i.e. the code definition alone fully specifies the supplementation/restriction/condition applicable to the vehicle and/or driver;

— in association with a sign (i.e. "<", "=", ">" or a valid combination thereof) and a value; the unit in which the value is expressed is included in either the definition of:

  — vehicle subcategory (i.e. cm^3, kW, kg or seats) as defined in ISO/IEC 18013-1:2018, Annex B, or

  — code description.

The grammar used in the code definition makes it clear if the code can be read on its own, or if it has to be interpreted with additional information. The code can apply to either a driver (licence holder) or to a vehicle, as applicable.

The code descriptions are defined in Table A.3.

Table A.3 — Code descriptions

Code	Description	Code	Description
01	Licence holder requires eye sight correction and/or protection	S02	The vehicle's authorized passenger seats, excluding the driver's seat, shall be
03	Licence holder requires prosthetic device for the limbs	S03	The vehicle's cylinder capacity (cm^3) shall be
78	Licence holder restricted to vehicles with automatic transmission	S04	The vehicle's power (kW) shall be
S01	The vehicle's maximum authorized mass (kg) shall be	S05	Licence holder restricted to vehicles adapted for physically disabled

EXAMPLE 1

The licence holder is authorised to drive category B vehicles, the licence category was issued 2003/MAY/31 and its expiry date is 2013/JUN/15. There are no restrictions.

B	20030531	20130615	Blank	Blank	Blank

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EXAMPLE 2

The licence holder is authorised to drive category CE vehicles, the licence category was issued 2003/MAY/31 and its expiry date is 2013/JUN/15. Driver requires eyesight correction for this category of vehicle only and is restricted to vehicles with automatic transmission.

CE	20030531	20130615	78	Blank	Blank
CE	Blank	Blank	01	Blank	Blank

EXAMPLE 3

The licence holder is authorised to drive category BE vehicles, the licence category was issued 2003/MAY/31 and its expiry date is 2013/JUN/15. Driver requires eyesight correction when driving any category of vehicle and is restricted to vehicles with automatic transmission.

BE	20030531	20130615	78	Blank	Blank
ALL	Blank	Blank	01	Blank	Blank

EXAMPLE 4

The licence holder is authorised to drive category A1 and C1 vehicles. The licence categories were issued on 1990/NOV/23 and 2003/MAY/31 respectively. The expiry date is 2013/JUN/15 for both categories. The driver requires eyesight correction for both categories, and the following supplementation details and restrictions are applicable to each of the subcategories:

Category A1: Maximum cylinder capacity of 250 cm^3

Category C1: Maximum authorized mass less than 8 000 kg, and restricted to vehicles with automatic transmission

Since the eyesight correction is applicable to the driver rather than associated with a particular category and to make it clear that the restriction to automatic transmission is only applicable to category C1, the information is rendered as follows:

A1	19901123	20130615	S03	<=	250
C1	20030531	20130615	S01	<	8000
C1	Blank	Blank	78	Blank	Blank
ALL	Blank	Blank	01	Blank	Blank

A.4.2 Domestic use

If an issuing authority wishes to expand on the codes for international interchange to restrict a particular driving privilege, it is recommended that the codes specified in this clause be used. Such expanded codes are applicable to domestic use only and hence limited to Data Group 11.

NOTE 1 Depending on whether codes are used for law enforcement or driving licence administration, some of the codes in this clause have the potential to be interpreted as being in conflict with human-readable information. The clarification of the domestic use of these codes is determined by each issuing authority.

Each code is of the format nn.xx where “n” and "x" are numerics, and ".xx" is optional for codes without sub-codes or with non-mandatory sub-codes.

The codes defined in this annex can be used in the following manners:

— on its own, i.e. the code definition alone fully specifies the supplementation/restriction/condition applicable to the vehicle and/or driver;

— in association with a sign “S” (i.e. “<”, “=”, “>” or a valid combination thereof) and a value “V”; the unit in which the value is expressed is included in either the definition of:

  — vehicle subcategory (i.e. cm^3, kW, kg or seats) as defined in ISO/IEC 18013-1:2018, Annex B, or

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— code description.

The grammar used in the code definition makes it clear if the code can be read on its own, or if it has to be interpreted with additional information. The code can apply to either a licence holder or to a vehicle, as applicable.

The list that follows identifies the code description for each code identified. Codes in this clause may be used in addition to the codes in A.4.1, but shall not be used in lieu of the codes in A.4.1.

EXAMPLE If code 72 is used (in Data Group 11), subcategory A1 with the necessary supplementations (S03 ≤ 125, S04 ≤ 11) shall also be used (in Data Group 1).

Code	Description	Code	Description
01.	Eyesight correction and/or protection (sub code use obligatory)	20.12	Measure to prevent obstruction or actuation of brake pedal
01.01	Glasses	20.13	Knee operated brake
01.02	Contact lens(es)	20.14	Brake system operation supported by external force
01.05	Eye cover	25.	Modified accelerator systems
01.06	Glasses or contact lenses	25.01	Adapted accelerator pedal
01.07	Specific optical aid	25.03	Tilted accelerator pedal
02.	Hearing aid/communication aid	25.04	Hand operated accelerator
03.	Prosthesis/orthosis for the limbs	25.05	Knee operated accelerator
03.01	Upper limb prosthesis/orthosis	25.06	Accelerator operation supported by external force
03.02	Lower limb prosthesis/orthosis	25.08	Accelerator pedal on the left
10.	Modified transmission	25.09	Measure to prevent obstruction or actuation of accelerator pedal
10.02	Automatic transmission	31.	Pedal adaptions and pedal safeguards
10.04	Adapted transmission control device	31.01	Extra set of parallel pedals
15.	Modified clutch	31.02	Pedals at (or almost at) the same level
15.01	Adapted clutch pedal	31.03	Measure to prevent obstruction or actuation of accelerator and brake pedals when pedals not operated by foot
15.02	Hand operated clutch	31.04	Raised floor
15.03	Automatic clutch	32.	Combined service brake and accelerator systems
15.04	Measure to prevent obstruction or actuation of clutch pedal	32.01	Accelerator and service brake as combined system operated by one hand
20.	Modified braking systems	32.02	Accelerator and service brake as combined system operated by external force
20.01	Adapted brake pedal	33.	Combined service brake, accelerator and steering systems
20.03	Brake pedal suitable for use by left foot	33.01	Accelerator, service brake and steering as combined system operation by external force with one hand
20.04	Sliding brake pedal	35.	Modified control layouts (Lights switches, wind-screen wiper/washer, horn, direction indicators, etc.)
20.05	Tilted brake pedal	35.02	Control devices operable without releasing the steering device
20.06	Hand operated brake	35.03	Control devices operable without releasing the steering device with the left hand
20.07	Brake operation with maximum force of ... N (for example: “20.07(300N)”) NOTE 2 This force indicates the driver's capability for operating the system.	35.04	Control devices operable without releasing the steering device with the right hand
20.09	Adapted parking brake	35.05	Control devices operable without releasing the steering device and the accelerator and braking mechanisms

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Code	Description	Code	Description
40.	Modified steering	44.09	Maximum operation force of front wheel brake ... N (for example "44.09(140N)")
40.01	Steering with maximum operation force of ... N (for example "40.01(140N)") NOTE 3 This force indicates the driver's capability for operating the system.	44.10	Maximum operation force of rear wheel brake ... N (for example "44.10(240N)") NOTE 4 This force indicates the driver's capability for operating the system.
40.05	Adapted steering wheel (larger/thicker steering wheel section, reduced diameter, etc.)	44.11	Adapted foot-rest
40.06	Adapted position of steering wheel	44.12	Adapted hand grip
40.09	Foot-operated steering	Letters used in combination with codes 01 to 44 for further specification:	
40.11	Assistive device at steering wheel	a:	left
40.14	One hand/arm operated alternative adapted steering system	b:	right
40.15	Two hand/arm operated alternative adapted steering system	c:	hand
42.	Modified rear/side view devices	d:	foot
42.01	Adapted device for rear view	e:	middle
42.03	Additional inside device permitting side view	f:	arm
42.05	Blind spot viewing device	g:	thumb
43.	Driver seating position	45.	Motorcycle with side-car only
43.01	Driver seat height for normal view and in normal distance from the steering wheel and the pedals	46.	Tricycles only
43.02	Driver seat adapted to body shape	47.	Restricted to vehicles of more than two wheels not requiring balance by the driver for starting, stopping and standing
43.03	Driver seat with lateral support for good stability	50.	Restricted to a specific vehicle/chassis number (vehicle identification number, VIN)
43.04	Driver seat with armrest	61.	Limited to daytime journeys (for example: one hour after sunrise and one hour before sunset)
43.06	Seat belt adaption	62.	Limited to journeys within a radius of ...km from holder's place of residence or only inside a city/region ...
43.07	Seat belt type with support for good stability	63.	Driving without passengers
44.	Modifications to motorcycles	64.	Limited to journeys with a speed not greater than ... km/h
44.01	Single operated brake	65.	Driving authorised solely when accompanied by a holder of a driving licence of at least the equivalent category
44.02	Adapted front wheel brake	66.	Without trailer
44.03	Adapted rear wheel brake	67.	No driving on motorways
44.04	Adapted accelerator	68.	No alcohol
44.08	Seat height allowing the driver, in sitting position, to have two feet on the surface at the same time and balance the motorcycle during stopping and standing	69.	Restricted to driving vehicles equipped with an alcohol interlock in accordance with EN 50436. Indication of an expiry date is optional (for example "69" or "69(01.01.2016)")

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Code	Description	Code	Description
70.	Exchange of licence No ... issued by ... (EU/UN distinguishing sign in the case of a third country; for example "70.0123456789.NL")	79.05	Restricted category A1 motorcycle with a power/weight ratio above 0,1 kW/kg
71.	Duplicate of licence No ... (EU/UN distinguishing sign in the case of a third country; for example "71.987654321.HR")	79.06	Restricted to category BE vehicle where the maximum authorised mass of the trailer exceeds 3 500 kg
73.	Restricted to category B vehicles of the motor quadricycle type (B1)	79.98	Restricted to tractors
78.	Restricted to vehicles with automatic transmission	79.99	Restricted to industrial or agricultural equipment
79.	Restricted to vehicles which comply with the specifications indicated in brackets (...)	80.	Restricted to holders of a driving licence for a category A vehicle of the motor tricycle type not having reached the age of 24 years
79.01	Restricted to two-wheel vehicles with or without side-car	81.	Restricted to holders of a driving licence for a category A vehicle of the two-wheel motorcycle type not having reached the age of 21 years
79.02	Restricted to category AM vehicles of the three-wheel or light quadricycle type	95.	Driver holding CPC meeting the obligation of professional aptitude provided for by Directive 2003/59/EC until ... (for example "95(01.01.12)")
79.03	Restricted to tricycles	96.	Category B vehicles combined with a trailer with a maximum authorised mass exceeding 750 kg where the maximum authorised mass of such combination exceeds 3 500 kg but does not exceed 4 250 kg
79.04	Restricted to tricycles combined with a trailer having a maximum authorised mass not exceeding 750 kg	97.	Not authorised to drive a category C1 vehicle which falls within the scope of Council Regulation (EEC) No 3821/85 NOTE 5 Council Regulation (EEC) No 3821/85 of 20 December 1985 on recording equipment in road transport (OJ L 370, 31.12.1985, p. 8).

A.4.3 Supplementation/restriction/condition codes for domestic use

A.4.3.1 Format of code

An issuing authority may add additional domestic codes to the list in A.4.2. Such codes shall be of the format nnn where "n" is a numeric and the smallest value of nnn is 100.

A.4.3.2 Examples

The following informative list contains examples of domestic codes defined by various issuing authorities. Codes duplicating the supplementation/restriction/condition specified in A.4.2 have been omitted.

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Code	Description	Code	Description
202	The vehicle's number of gears shall be	607	Tractor mass > Trailer mass
350	The maximum authorised (pay) load mass (kg) (excluding the unladen vehicle mass) shall be	608	Full trailer
401	The vehicle's authorized length (m) shall be	609	Semi-trailer
402	The vehicle's authorized width (m) shall be	610	Camping trailer
403	The vehicle's authorized height (m) shall be	701	No passenger
406	The vehicle's authorized total number of wheels shall be	702	The vehicle's authorized power to weight ratio (kW/kg) shall be
407	The vehicle's authorized wheel base (m) shall be	703	The vehicle's authorized torque to weight ratio (Nm/kg) shall be
408	The vehicle's authorized vehicle tread length (m) shall be	704	With sidecar
409	The vehicle's authorized total number of axles shall be	705	Without sidecar
501	The vehicle's cylinder capacity (cm3) shall be	706	The seat height (m) shall be
502	Electrical propulsion	707	The handlebar height (m) shall be
504	The vehicle's torque (Nm) shall be	708	Left hand operated brake
505	The vehicle's engine speed (r/min) shall be	709	Right hand operated brake
506	The vehicle's total number of cylinders shall be	711	Hand operated front/rear brakes
507	The vehicle's total number of rotors shall be	801	Power steering
509	The vehicle's turbo (super charger) boost pressure (kPa) shall be	806	Hand operated accelerator
601	No trailer (including light trailers of which the authorised mass does not exceed 750 kg)	808	Modified side mirror
602	The trailer's authorized mass (kg) shall be	901	Business purposes only
603	The combined (Tractor + Trailer(s)) authorized mass (kg) of the vehicles shall be	902	Employment purposes only
604	The combined (Tractor + Trailer(s)) vehicle length (m) shall be	903	The vehicle's speed (mile/h) shall be
605	The authorized total number of trailers shall be	999	There is (are) other restriction(s). Ask the Authority
606	Tractor mass ≥ Trailer mass		

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Annex B
(normative)

Compact encoding

B.1 General

This annex defines the compact encoding scheme when limited memory capacity is available for the IDL application (not exceeding 5 kB). This scheme requires the read device to read all data at the same time, after which the data is then parsed.

For compact encoding, a typical minimum capacity of 300 usable bytes is required. Typical media on which compact encoding is implemented are:

— 2D bar codes,

— RFID, and

— PICs and ICs with contacts with limited capacity available for the IDL application.

The limited storage capacity means that the number of data groups is restricted, as is the data size of each. The compact encoding scheme accordingly provides for Data Group 1, and optionally for any combination of data groups 2, 3, 4, 7 and 11 subject to storage capacity availability.

The annex also prescribes means of validating and authenticating the stored data.

B.2 Overview

The compact encoding method generates one data string containing all data groups. This data string is written to (and read from) storage media in the format provided for by each technology.

The compact encoding method differentiates between the following two types of data groups:

— Type 1 data group: Data groups that contain only data of which the allowable characters are specified in this document (i.e. data groups 1, 2 and 3).

— Type 2 data group: Data groups that include data of which the allowable characters are specified by another standard (i.e. data groups 4 and 7), and which thus may include delimiters as part of the field content.

Data Group 11 can be either a Type 1 or a Type 2 data group, depending on the information stored in this Data Group.

The encoding of data in a Type 1 data group is based on a fixed sequence of possible data elements in the data file. Each data field and data group (including optional and/or empty data fields and data groups) is terminated by an "end of field" or "end of data group" indicator. Data fields read sequentially from the data file thus can be assigned the appropriate data field name. This encoding method does not require each field to be identified individually with a tag in the data file, nor does it require the length of any field to be included in the data file.

The parsing rules for a Type 2 data group do not depend on delimiters to identify the data fields. Sufficient information is supplied in the data to calculate the position of the first and last bytes of each data field in the data stream.

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B.3 Character set encoding

Unless otherwise specified, data objects are encoded as indicated in Table B.1.

Table B.1 — Encoding rules

Object	Encoding
Data fields of which the abstract values are defined as consisting of only N characters	BCD
Data fields of which the abstract values are defined as containing (although not necessarily exclusively) any A or S characters	ISO/IEC 8859-1 shall apply
Delimiters	ISO/IEC 8859-1 shall apply
Data object length	ASN.1
NOTE A field that is defined in this document as containing (amongst others) A and/or S characters will always be encoded using ISO/IEC 8859-1, even if an issuing authority's implementation of the same field is limited to N characters.	

B.4 Structure

B.4.1 Data file

The structure of a data file created using compact encoding can be represented as follows:

[header] × [Data Group 1] × [Data Group 2] × [Data Group 3] × [Data Group 4] × [Data Group 7] × [Data Group 11]¶

The header and Data Group 1 are mandatory; all other elements of the data file are optional. Data groups are delimited using the data group delimiter (×). The number of data group delimiters is fixed regardless of the number of optional data groups actually present. Data Group 11 is followed by the end of file delimiter (¶).

NOTE The data group delimiter (×) is a multiplication sign and not a lower case X. Spaces (periods) have been inserted before and after the data group delimiter and before the end of file delimiter above for ease of reading only.

B.4.2 Header

The header consists of the following components:

[AID] [version] [length]

where

AID is the application identifier, 7 bytes; consisting of a 5 byte Registered Application Identifier (RID), and a 2 byte Proprietary Application Identifier Extension (PIX);

NOTE Separate PIXs are used for compact encoding (depending on the media used) and standard encoding — see Clause 9 for the values of the RID and the PIX.

Version is the 2 byte number; the first byte is assigned by ISO/IEC JTC 1/SC 17/WG 10 for each new version of this document; The value of the byte for this version shall be '01'; the second byte is assigned by the issuing authority for each new version of their specification controlling the coding of domestic data (Data Group 11);

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Length is the length of the data file (in bytes), encoded using ASN.1; the length equals the total number of bytes from (and including) the data group delimiter between the header and Data Group 1, up to and including the last character of the Logical Data Structure (LDS) (i.e. the end of file delimiter).

NOTE Although it is strictly speaking not necessary to know the length of the data file, it is included to assist in read verification.

EXAMPLE

Suppose that:

RID	=	A0 00 00 02 48 (number assigned to *International Interchange Driving Licence Application*)
PIX	=	01 00 (Application 1: Compact encoding — all technologies, excluding ICs)
WG 10 version level	=	1
Domestic version level	=	not specified (defaults to 0)
Total length	=	1598 bytes ('82 06 3E' in ASN.1 hexadecimal representation)

Then, the header would be encoded as follows (spaces are included for clarity only and are not encoded; apostrophes are used to indicate hexadecimal characters and are not encoded):

'A0 00 00 02 48 01 00 01 00 82 06 3E'

B.4.3 Type 1 data group

A Type 1 data group consists of data elements delimited by the field delimiter (÷) as follows:

…× [element_1] ÷…÷ [element_n] ÷…÷ [element_last] ×…

All data elements are delimited (including optional elements), regardless of whether or not an element contains data. The only exception is if the data group contains no data, in which case no field delimiters are used. To facilitate forward compatibility, parsers shall be able to accommodate additional elements appended to a data group.

A data element can be sub-divided into data sub-fields. In a Type 1 data group, sub-fields are delimited by a sub-field delimiter [(;) sub-delimiter for short] as follows:

…[element_2] ÷ [field_3.1] ; [field_3.2] ; [field_3.3] ÷ [element_4]…

If a data sub-field is the last data element in a data group, it is terminated with the data group delimiter.

For data elements containing a fixed number of data sub-fields (e.g. the address field), the number of sub-delimiters is constant, regardless of the number of optional sub-fields present. The only exception is if none of the sub-fields contain data, in which case no sub-field delimiters are present.

The set of sub-fields in a data field may be repeated. If a set of sub-fields is not terminated with a field delimiter or a data group delimiter, it means that the next field will be the first sub-field of another set of sub-fields.

EXAMPLE A licence category field consists of 6 sub-fields, of which the first sub-field is mandatory. A licence category field containing 3 licence categories can then be coded as follows:

…÷ [category_1—field_1] ; [category_1—field_2] ; [category_1—field_3] ; ; ; ; [category_2—field_1] ; ; ; [category_2—field_4] ; ; ; [category_3—field_1] ; ; ; [category_3—field_4] ; [category_3—field_5] ; [category_3—field_6] ÷…

NOTE Spaces (periods) have been inserted before and after the data group, field and sub-field delimiters above for ease of reading only.

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B.4.4 Type 2 data group

The contents of a Type 2 data group can generally be represented as follows:

× [fixed_length_field_1] [fixed_length_field_2] … [fixed_length_field_n] [variable_length_field_length] [variable_length_field] ×

where × is the data group delimiter. The length of a variable_length_field is specified using ASN.1 rules (see C.5). The number of fixed length fields and the number of variable length fields is not restricted. The number and sequence of fields are specified in the data group definition.

B.5 Implementation

B.5.1 Data Group 1: mandatory data

Data Group 1 is a Type 1 data group.

A sub-field delimiter is used between different instances of the category of vehicle/restriction/condition data object.

EXAMPLE 1

Assume the following:

Family name	=	Smithe-Williams
Given name	=	Alexander George Thomas
Date of birth	=	1 March 1970
Date of issue	=	15 September 2002
Date of expiry	=	30 September 2007
Issuing country	=	Japan
Issuing authority	=	HOKKAIDO PREFECTURAL PUBLIC SAFETY COMMISSION
Licence number	=	A2906543951642 73X

Categories of vehicles, restrictions:

Category B vehicles, issued 1 September 1991, expires 1 March 2035

The above data group will be coded as follows:

[header]×Smithe-Williams÷Alexander George Thomas÷'19 70 03 01'÷'20 02 09 15'÷'20 07 09 30'÷JPN÷HOKKAIDO PREFECTURAL PUBLIC SAFETY COMMISSION÷A2906543951642 73X÷B;19910901;20350301;;;×[next data group]

where

Smi...ams	=	Family name;
Ale...mas	=	Given names;
'19 70 03 01'	=	BCD encoding of birthday, 1 March 1970;
'20 02 09 15'	=	BCD encoding of IDL issue date, 15 September 2002;
'20 07 09 30'	=	BCD encoding of IDL expiry date, 30 September 2007;
JPN	=	Issuing country;
HOK...SION	=	Issuing authority;
A29....73X	=	Licence number;
B	=	Category B vehicles;
'19 91 09 01'	=	BCD encoding of issue date of category B, 1 September 1991;
'20 35 03 01'	=	BCD encoding of expiry date of category B, 1 March 2035.

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EXAMPLE 2

Assume the same data as Example 1 with the following vehicle subcategories and restrictions:

Subcategory A1, with maximum cylinder capacity of 250 cm^3, issued 15 September 2002, expires 30 September 2017.

Subcategory C1 with a maximum authorised mass less than 8000 kg, restricted to vehicles with automatic transmission.

Eyesight correction required for both vehicle subcategories.

The above data group will be coded as follows:

[header] × Smithe-Williams ÷ Alexander George Thomas ÷ '19 70 03 01' ÷ '20 02 09 15' ÷ '20 07 09 30' ÷ JPN ÷ HOKKAIDO PREFECTURAL PUBLIC SAFETY COMMISSION ÷ A290654395164273X ÷ A1;'20 02 09 15';'20 17 09 30';S03;<=; '32 35 30';C1;;;S01;<=;'38 30 30 30';C1;;;78;;;ALL;;;01;; × [next data group]

where

A1	=	Category A1 vehicles;
'20 02 09 15'	=	Issue date for category A1;
'20 17 09 30'	=	Expiry date for category A1;
S03	=	Code for "The vehicle's cylinder capacity (cm^3) shall be";
<=	=	Less than or equal to;
'32 35 30'	=	250 $cm^{3;}$
C1	=	Category C1 vehicles. Note that the validity period for the category C1 licence is the same as for the IDL.;
S01	=	Code for "The vehicle's maximum authorized mass (kg) shall be";
<=	=	Less than or equal to;
'38 30 30 30'	=	8 000 kg;
C1	=	Continuation of category C1 vehicles;
78	=	Code for "Restricted to vehicles with automatic transmission";
ALL	=	Start of restriction that applies to all categories;
01	=	Code for "Sight correction and/or protection".

B.5.2 Data Group 2: optional licence holder information

Data Group 2 is a Type 1 data group.

EXAMPLE

Assume the following:

Gender	=	Male
Height	=	172 cm
Weight	=	82 kg
Eye colour	=	Blue
Hair colour	=	Bald
Normal place of residence	=	471 Monica Road, 201 Delta Building, Lynnwood, Gauteng, 0186, South Africa

The above data group will be coded as follows:

[previous data group] × '01' ÷ '01 72' ÷ '00 82' ÷ BLU ÷ BLD ÷ ÷ 471 Monica Road;201 Delta Building;Lynnwood;Gauteng;0186;South Africa × [next data group]

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where

'01'	=	male (per ISO/IEC 5218)
'01 72'	=	BCD encoding of height, 172 cm
'00 82'	=	BCD encoding of weight, 82 kg
BLU	=	Blue eyes
BLD	=	Bald
471 Mo...rica	=	Residence information

NOTE No place of birth included.

B.5.3 Data Group 3: optional issuing authority details

Data Group 3 is a Type 1 data group.

The document discriminator field as well as the data discriminator field shall be each encoded as a 1 byte binary number. The ISO issuer ID number field shall be encoded as a 4 byte BCD number.

EXAMPLE

Assume the following:

Administrative number	=	123456789B
Document discriminator	=	01
ISO issuer ID number	=	63600000

The above data group will be coded as follows:

[previous data group] × 123456789B ÷ '01' ÷ '63 60 00 00' × [next data group]

where

123456789B	=	Administrative number;
'01'	=	Document discriminator;
'63 60 00 00'	=	BCD encoding of ISO issuer ID number.

NOTE No data discriminator included.

B.5.4 Data Group 4: optional portrait images

For compact encoding, Data Group 4 supports one portrait image only. Consequently, not all of the fields defined in 8.5 are provided for. The coding of the portrait image is specified outside of this document, and thus Data Group 4 is a Type 2 data group. Data Group 4 is coded as follows (spaces are included to enhance legibility only, and are not encoded):

[previous data group] × [type of image] [image length] [image] × [next data group]

where

[type of image] is a fixed length field;

[image length] is the length of the [image] field, expressed using ASN.1 rules;

[image] is a variable length field;

the [image] field is encoded as a binary object.

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EXAMPLE

Assume that the data group consists of one JPEG portrait image with a total length of 2075 bytes ($81B_{16}$ bytes). This will be encoded as follows:

[previous data group] × '03' '82 08 1B' [2075_{10} byte image field] × [next data group]

where

'03' = image type 3 (JPEG);
'82 08 1B' = ASN.1 encoding of the image length of 2075 bytes;
..image..... = Image field including definition details and binary data.

B.5.5 Data Group 5: optional signature/mark image

Data Group 5 is not supported in compact encoding.

B.5.6 Data Group 6: optional facial biometric template

Data Group 6 is not supported in compact encoding.

B.5.7 Data Group 7: optional finger template

Data Group 7 is a Type 2 data group. Due to limited storage space, only finger minutiae data and finger pattern spectral data are supported in Data Group 7. This limitation precludes the use of optional data elements listed in Table 7.

Data Group 7 thus is coded as follows (spaces are included to enhance legibility only, and are not encoded):

[previous data group] × [BDB format owner] [BDB format type] [biometric data block length] [biometric data block] × [next data group]

where

[BDB format owner] is a fixed length field;

[BDB format type] is a fixed length field;

[biometric data block length] is the length of the [biometric data block] field, expressed using ASN.1 rules;

[biometric data block] is a variable length field, encoded in accordance with Table B.1, with the understanding that delimiters may be included in data fields as data (i.e. without fulfilling a delimiting function).

The content of the biometric data block shall comply with ISO/IEC 19794-2:2005 or ISO/IEC 19794-3:2006. Consequently, the BDB format owner and BDB format type combinations in Table B.2 are valid.

Table B.2 — BDB format owner and type combinations

BDB format owner	BDB format type
'01 01'	'00 01' (finger-minutia-record-n)
'01 01'	'00 02' (finger-minutia-record-x)
'01 01'	'00 03' (finger-minutia-card-normal-v))

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Table B.2 *(continued)*

BDB format owner	BDB format type
'01 01'	'00 04' (finger-minutia-card-normal-n)
'01 01'	'00 05' (finger-minutia-card-compact-v)
'01 01'	'00 06' (finger-minutia-card-compact-n)
'01 01'	'00 0A' (finger-pattern-spectral)

EXAMPLE

Assume that the data group consists of a finger pattern spectral biometric data block with a total length of 234 bytes ('EA'$_{16}$ bytes). This will be encoded as follows:

[previous data group]× '01 01' '00 0A' '81 EA' [234_{10} byte biometric data block]×[next data group]

where

'01 01' = BDB format owner (ISO/IEC JTC 1/SC 37, *Biometrics*);
'00 0A' = BDB format type (finger pattern spectral data format as specified in ISO/IEC 19794-3:2006);
'81 EA' = ASN.1 encoding of the biometric data block length of 234 bytes;
..image..... = Image data block including definition details and binary data.

B.5.8 Data Group 8: optional iris biometric template

Data Group 8 is not supported in compact encoding.

B.5.9 Data Group 9: optional other biometric template

Data Group 9 is not supported in compact encoding.

B.5.10 Data Group 10: reserved for future use

Data Group 10 is not currently supported in compact encoding.

B.5.11 Data Group 11: optional domestic use

This data group is reserved for domestic use and hence the encoding is defined domestically.

B.5.12 Overall example

John Bull (a male) was born on the 29th of February 1976 in Campbeltown, Scotland. On 29 February 2000, the Driver and Vehicle Licensing Agency of the UK Department for Transport issued John an IDL (number BTCB20996) that expires after 4 years. The IDL authorises John to drive motorcycles (since 15 March 1992) and passenger cars (since 8 May 1996), provided that he wears his glasses.

The issuing authority has also assigned an administrative number (102T776) to the IDL.

One portrait image (1003 bytes) using JPEG2000 compression is included. The minutiae of his right index finger are stored as well (613 byte data block; compact size, with ridge skeleton end and ridge skeleton bifurcation points).

The above information will logically be written as set out below (square brackets and spaces are used where appropriate to improve readability; single quotes signify hexadecimal numbers):

['A0 00 00 02 48 01 00'] ['01 00'] [1793] × [Bull] ÷ [John] ÷ [19760229] ÷ [20000229] ÷ [20040228] ÷ [GBR] ÷ [Driver and Vehicle Licensing Agency] ÷ [BTCB20996] ÷ [A;19920315;;;;;B;19960508;;;;;ALL;;01;;;] × ['01'] ÷ ÷ ÷ ÷ ÷ [Campbeltown;Scotland;United Kingdom] ÷ × [102T776] ÷ ÷ ÷ ×[4] [1003] [portrait image] × ['01 01'] ['00 06'] [613] [biometric data] × ¶

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The above fields will be encoded as follows (all numbers are hexadecimal):

[A0 00 00 02 48 01 00] [01 00] [82 07 01] × [42 75 6C 6C] ÷ [4A 6F 68 6E] ÷ [19 76 02 29] ÷ [20 00 02 29] ÷ [20 04 02 28] ÷ [47 42 52] ÷ [44 72 69 76 65 72 20 61 6E 64 20 56 65 68 69 63 6C 65 20 4C 69 63 65 6E 73 69 6E 67 20 41 67 65 6E 63 79] ÷ [42 54 43 42 32 30 39 39 36] ÷ [41 3B 19 92 03 15 3B 3B 3B 3B 3B 42 3B 19 96 05 08 3B 3B 3B 3B 3B 41 4C 4C 3B 3B 30 31 3B 3B 3B] × [01] ÷ ÷ ÷ ÷ ÷ [43 61 6D 70 62 65 6C 74 6F 77 6E 3B 53 63 6F 74 6C 61 6E 64 3B 55 6E 69 74 65 64 20 4B 69 6E 67 64 6F 6D] ÷ × [31 30 32 54 37 37 36] ÷ ÷ ÷ × [04] [82 03 EB] [portrait image] × [01 01] [00 06] [82 02 65] [biometric data] × ¶

The final byte stream will be as follows:

A0 00 00 02 48 01 00 01 00 82 07 01 D7 42 75 6C 6C F7 4A 6F 68 6E F7 19 76 02 29 F7 20 00 02 29 F7 20 04 02 28 F7 47 42 52 F7 44 72 69 76 65 72 20 61 6E 64 20 56 65 68 69 63 6C 65 20 4C 69 63 65 6E 73 69 6E 67 20 41 67 65 6E 63 79 F7 42 54 43 42 32 30 39 39 36 F7 41 3B 19 92 03 15 3B 3B 3B 3B 3B 42 3B 19 96 05 08 3B 3B 3B 3B 3B 41 4C 4C 3B 3B 30 31 3B 3B 3B D7 01 F7 F7 F7 F7 F7 43 61 6D 70 62 65 6C 74 6F 77 6E 3B 53 63 6F 74 6C 61 6E 64 3B 55 6E 69 74 65 64 20 4B 69 6E 67 64 6F 6D F7 D7 31 30 32 54 37 37 36 F7 F7 F7 D7 04 82 03 EB [portrait image byte stream] D7 01 01 00 06 82 02 65 [biometric data byte stream] D7 B6

B.6 File structure for ICCs with contacts and for PICCs

Information on an ICC with contacts and on a PICC is stored in a file system, which shall be as defined by ISO/IEC 7816-4. The card file system is organized hierarchically into DFs and EFs. DFs contain other DFs and/or EFs. An MF, if present, is the root of the file system. Additional DF and EF structures other than the IDL application DF may be included to meet the requirements of the ISO/IEC 24727 series[1)]. These do not affect the basic IDL application DF structures. The detail required to manage access conditions and interoperability is specified in ISO/IEC 18013-3.

The IDL application is defined as one DF. The DF for compact encoding is identified as follow:

‘A0 00 00 02 48 03 00’

The DF is selected using its AID. If other applications exist on the card, they would be contained within their own DF and would be accessed via their separate AID.

The DF comprises one EF only.

The compact encoded data string is stored in the one EF, named EF.CE, with short EF identifier = '0D', file identifier = '000D' and Tag = '53'. The tag is followed by the compact encoded data string.

NOTE 1 Implementers may see C.6 for a full list of data objects and tags.

For compact encoding, EF.COM will not be present. Refer for Figure B.1 for a graphical depiction of the file structure.

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1) The ISO/IEC 24727 series provides an alternate mechanism for identifying applications and application capability as well as card capability via discoverable card and application capability containers which may optionally be included on the IDL.

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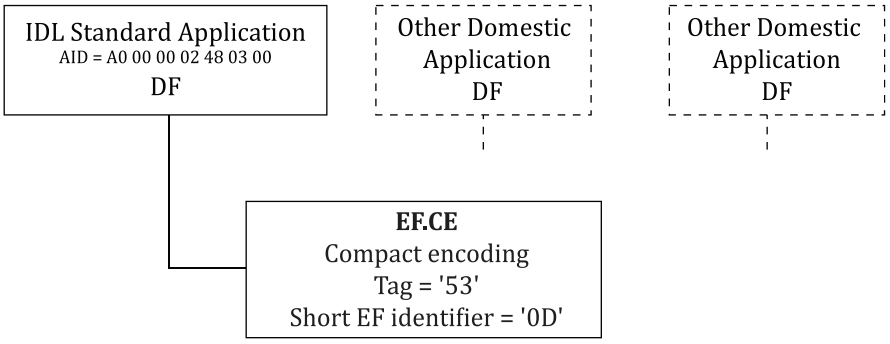

Figure B.1 — Logical data structure

NOTE 2 Although the header and the data group delimiter between the header and DG1 (in the compact encoding constructed data object) are strictly speaking not necessary, it is nevertheless retained for consistency purposes.

NOTE 3 In order to improve clarity, in the example that follows tags are printed in *ITALIC TYPE* and values are printed in UPRIGHT TYPE.

EXAMPLE

Assume a compact encoding constructed data object that commences with 'A0 00 00 02 48 01 00 03 00 82 07 0A' (the header) and concludes with 'B6' (the end of file delimiter). Encoding would be (spaces and italics are included for legibility only, and are not encoded):

'*53*' 'A0 00 00 02 48 03 00 01 00 82 07 0A ... B6'

where

'*53*' = Tag the CE Data Group;
'A0 00 ... B6' = Compact encoding constructed data object.

The requirements of the following clauses in Annex C also apply to B.6:

— C.1.2;

— C.1.3;

— C.1.4;

— C.2, with the exception of C.2.8;

— A.1.

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Annex C
(normative)

Standard encoding for ICCs with contacts and for PICCs

C.1 Overview

C.1.1 General

Standard encoding is designed for random access and is suitable for use on documents employing ICCs with contacts and PICCs based on the ISO/IEC 7816 series and the ISO/IEC 14443 series respectively.

C.1.2 Design considerations

The file structure and encoding rules have been defined with the following considerations and assumptions:

- A wide variety of implementations shall be supported to satisfy specific needs of different issuing authorities. More specifically the data structure shall efficiently support:
  - mandatory and optional sets of data elements;
  - multiple occurrences of specific data elements that may exist within a data group;
  - a range of possible access conditions in respect of optional data elements as required by different issuing authorities (due to significant variance in business requirements driven by privacy and other statutory requirements);
  - the unconditional availability of mandatory data;
  - an optional mechanism to verify one or more digital signatures;
  - discovery of the interoperability and security requirements in respect of the optional data elements from the card.
- The structure supports at least two (2) application data sets:
  - the IDL application, which has the following properties:
    - contains data elements with the following properties:
      - includes information that would enable a reading authority to identify the access control, authentication and integrity validation mechanisms present on the card;
      - write protected;
      - modifiable by the issuing authority (or trusted agent of the issuing authority), subject to the requirements in 5.2 (for example the machine-readable data may not differ from the human-readable data);
    - optionally protected with one or more digital signatures (defined in ISO/IEC 18013-3);
  - DDL application(s) — outside the scope of this document;
- Contact between the driver licence and passport environments is considered more likely than contact between the driver licence environment and non-passport environments (that are compliant with the ISO/IEC 7816 series). Consequently, tag assignments shall be aligned with ICAO Doc 9303.

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C.1.3 Interoperability considerations

To provide global interoperability this annex defines:

— physical characteristics;

— location and dimensions of the contacts or coupling areas;

— electrical signals to support communication between the IC and the interface device;

— transmission protocols;

— application selection and discovery of optional data elements and security requirements;

— encoding rules;

— the file structure and tag assignments for the IDL Logical Data Structure;

— command set;

— data element mappings to the files.

NOTE Although it is important for interoperability, this document does not define the human-readable properties of the IDL, which are defined in ISO/IEC 18013-1.

C.1.4 Security requirements

Issuing authorities may need to confirm data validity and authenticity. ISO/IEC 18013-3 specifies mechanisms and means by which to achieve this.

C.2 Compatibility with existing standards

C.2.1 Approach

This document is based on supporting infrastructure provided by a number of other key ISO Standards:

— existing manufacturing standards, the ISO/IEC 7816 series and the ISO/IEC 14443 series (for ICC and PICC devices respectively) that ensure support for a broad range of cards and devices by multiple manufacturers;

— the ISO/IEC 24727 series, which may optionally be used;

— biometric standards under development by ISO/IEC JTC 1/SC 37;

— other identification document standards such as those under development by ISO/IEC JTC 1/SC 17/WG 3 and by ICAO.

C.2.2 Physical characteristics

The physical characteristics of the card shall adhere to ISO/IEC 7816-1 for ICCs with contacts and ISO/IEC 14443-1 for PICCs.

C.2.3 Location and dimensions of contacts or coupling area

Contact size and location for ICCs with contacts shall adhere to ISO/IEC 7816-2. Location and size of contactless coupling area for PICCs shall adhere to ISO/IEC 14443-1.

C.2.4 Electronic signals

Electronic signals for ICCs with contacts shall adhere to ISO/IEC 7816-3. Magnetic fields and radio frequency power for PICCs shall adhere to ISO/IEC 14443-2.

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C.2.5 Transmission protocols

C.2.5.1 ICCs with contacts

The IDL shall as a minimum support T = 0 or T = 1 as specified by ISO/IEC 7816-3.

Application design and hardware used to support high-speed transmission is recommended.

C.2.5.2 PICCs

The IDL shall be compatible with ISO/IEC 14443-1 to ISO/IEC 14443-4 and support half-duplex transmission protocol specified by ISO/IEC 14443-4.

C.2.6 Application selection

The IDL supports the following applications:

— One application shall consist of data recoded by the issuing authority in accordance with the ISO/IEC 18013 series.

— One or more applications may be added for other domestic or regional applications, such as applications provided for in ISO/IEC 24727. Such applications shall be loaded under the control of the issuing authority.

The applications shall be selected by use of the seven byte Application Identifier (AID) as a reserved DF name. The AID shall consist of the Registered Application Identifier (RID), 'A0 00 00 02 48' which has been assigned by ISO/IEC JTC 1/SC 17/WG 5 in accordance with ISO/IEC 7816-5, and two additional bytes comprising a Proprietary Application Identifier Extension (PIX) (see Clause 9).

C.2.7 Security

The security mechanisms specified in ISO/IEC 18013-3 support the objectives described in the Introduction of this document.

All data groups shall be write protected. Only the issuing authority (or the issuing authority's trusted agent) shall have write access (subject to the requirements in 5.2). It is left to the Issuing Authority to define the write protection.

Issuing authorities may optionally either:

— allow free read access to all data groups, or

— set specific access control rules under ISO/IEC 18013-3 to any or all optional data groups. The mechanism for setting and discovering the appropriate access controls is specified in ISO/IEC 18013-3.

C.2.8 Character set encoding

Unless otherwise specified, data objects are encoded as specified in Table C.1.

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Table C.1 — Encoding rules

Object	Encoding
Data fields of which the abstract values are defined as consisting of only N characters	BCD
Data fields of which the abstract values are defined as containing (although not necessarily exclusively) any A or S characters	ISO/IEC 8859-1 shall apply
Delimiters	ISO/IEC 8859-1 shall apply
Data object length	ASN.1
Tag	Binary

A field that is defined in this document as containing (amongst others) A and/or S characters shall be encoded using ISO/IEC 8859-1, even if an issuing authority's implementation of the same field is limited to N characters.

C.3 File structure

Information on an ICC with contacts and on a PICC is stored in a file system, which shall be as defined by ISO/IEC 7816-4. The card file system is organized hierarchically into DF and EFs. DFs contain other DFs and/or EFs. An MF, if present, is the root of the file system. Additional DF and EF structures other than the IDL application DF may be included to meet the requirements of the ISO/IEC 24727 series[2]. These do not affect the basic IDL application DF structures. The detail required to manage access conditions and interoperability is specified in ISO/IEC 18013-3.

The IDL application is defined as one DF. The DF for standard encoding is identified as follow:

'A0 00 00 02 48 02 00'

The DF is selected using its AID. If other applications exist on the card, they would be contained within their own DF and would be accessed via their separate AID.

Each DF consists of a number of EFs. The DF for standard encoding consists of one EF containing common data, and one EF for each of the data groups defined in this annex.

All EFs are in the form of data templates as defined in C.4 and have individual ASN.1 tags to support direct retrieval (see C.5). The structure and coding of data objects shall conform to ISO/IEC 7816-4 and ISO/IEC 7816-6. The assigned tags shall conform to the co-existent tag allocation scheme as defined in ISO/IEC 7816-4. SC17/WG 10 is the tag allocation authority for ISO/IEC 18013 series and inter-industry tags are used. Refer to C.6 for a list of data objects and tags.

The EF that contains the common information for the IDL application is named EF.COM. The short EF identifier for this file is '1E'. This file contains the LDS version number and a list of the data groups (tag list) that are present for any given implementation. In addition, this file may contain information related to data access control, authentication and integrity validation.

For standard encoding, each data group shall be stored in one EF with a short EF identifier as shown in Table C.2. The names for the files shall be EF.DG*n*, where *n* is the data group number, e.g., EF.DG1, EF.DG4. Refer for Figure C.1 for a graphical depiction of the file structure.

2) The ISO/IEC 24727 series provides an alternate mechanism for identifying applications and application capability as well as card capability via discoverable card and application capability containers which may optionally be included on the IDL.

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Table C.2 — Assignment of file identifiers and Data Group tags

Elementary file	Name	Short EF identifier	File identifier	Tag
EF.COM	Common data	'1E'	'001E'	'60'
EF.DG1	Mandatory data	'01'	'0001'	'61'
EF.DG2	Optional licence holder details	'02'	'0002'	'6B'
EF.DG3	Optional issuing authority details	'03'	'0003'	'6C'
EF.DG4	Optional portrait image	'04'	'0004'	'65'
EF.DG5	Optional signature/usual mark image	'05'	'0005'	'67'
EF.DG6	Optional facial biometric template	'06'	'0006'	'75'
EF.DG7	Optional finger biometric template	'07'	'0007'	'63'
EF.DG8	Optional iris biometric template	'08'	'0008'	'76'
EF.DG9	Optional other biometric template	'09'	'0009'	'70'
EF.DG10	Reserved for future use	'0A'	'000A'	
EF.DG11	Optional domestic application data	'0B'	'000B'	'6D'
EF.DG12	Non-match alert	'0C'		'71'
EF.DG13	Active authentication	'0D'		'6F'
EF.DG14	Extended access control	'0E'		'6E'
EF.SOD	Document security object	'1D'		'77'
NOTE Selected tag assignments are aligned with ICAO Doc 9303. For example, Tag '75' identifies facial biometric irrespective of the DG in which it appears.				

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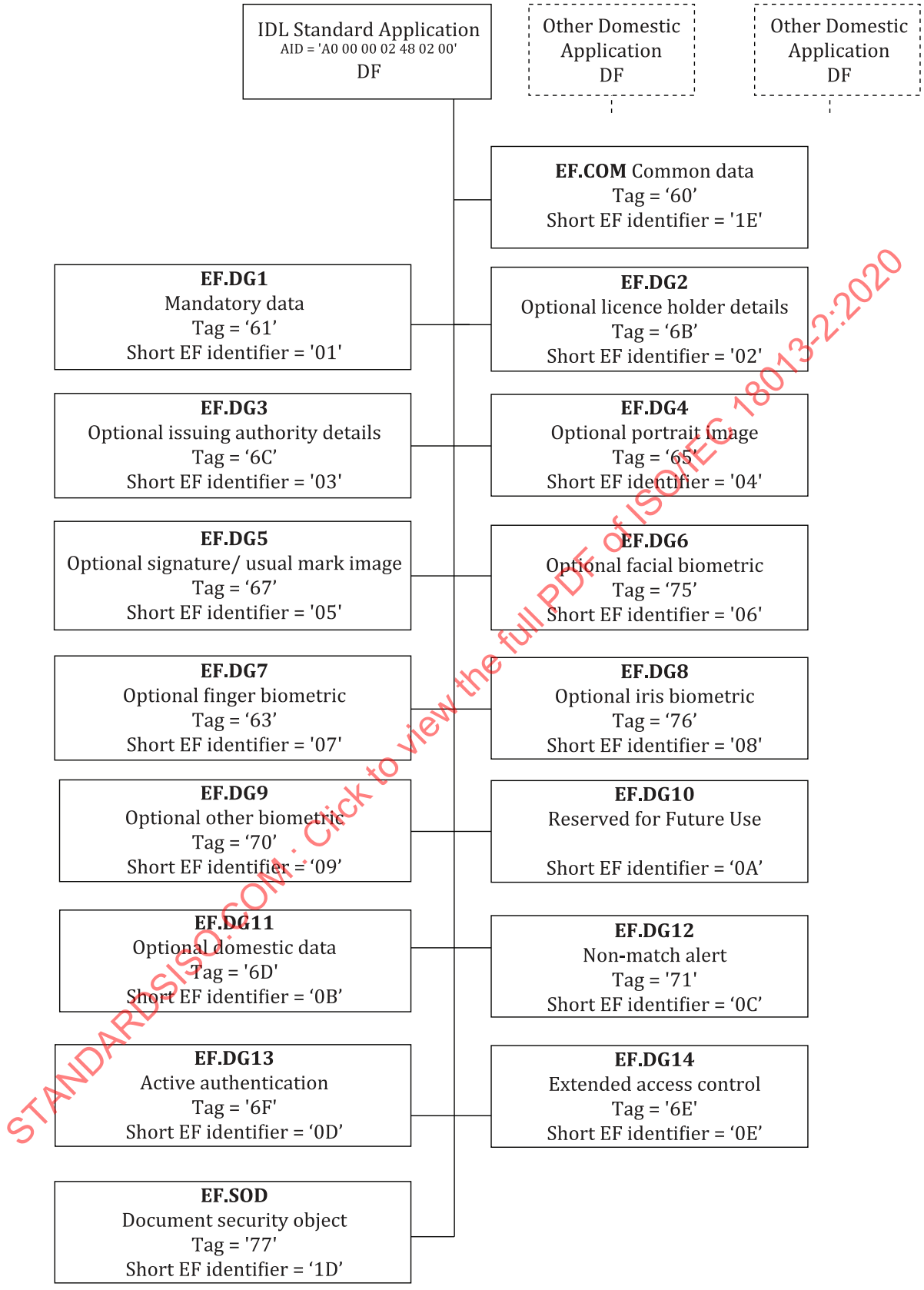

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Figure C.1 — Logical data structure

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C.4 Data groups

C.4.1 EF.COM — Common data elements, Tag = '60', short EF identifier = '1E'

This template has two data elements, the LDS version level ('5F01') and a tag list ('5C') as defined in Table C.3. The tag list, as the name implies, is a list of the tags of the data groups present for any given implementation, and also specifies the access protection applicable.

Table C.3 — EF.COM

Tag	Length	Value		
'60'	X	EF.COM contents		
		Tag	**Length**	**Value**
		'5F01'	X	Version number with format aabb, where aa defines the major revision level and bb defines the release level. aa and bb are numeric and encoded as 2 bytes in BCD. The major revision level is assigned by ISO/IEC JTC 1/SC 17/WG 10 for each new version of this document and shall be 01 in this version. The release level is assigned by the issuing authority for each new version of their specification controlling coding of domestic data.
		'5C'	X	DG tag list as per Table C.2

The template structure has been defined to support future developments. Supporting specifications may require the inclusion of additional tags within EF.COM. Additional tags relating to security are defined in ISO/IEC 18013-3.

NOTE In order to improve clarity, in the examples that follow tags are printed in *ITALIC TYPE*; lengths are printed in UNDERLINED TYPE and values are printed in UPRIGHT TYPE.

EXAMPLE Assume an implementation using LDS Version 1.0 having the following data content — mandatory data, optional licence holder data, optional issuing authority information, a portrait image and an optional signature/mark image. Encoding would be (spaces, underlining and italics are included for legibility only, and are not encoded):

'60' '0C'
'5F 01' '02' '01 00'
'5C' '05' '61' '6B' '6C' '65' '67'

C.4.2 EF.DG1 Data Group 1, mandatory data, Tag = '61', short EF identifier = '01'

C.4.2.1 General

This EF contains the mandatory demographic data elements and vehicle categories/restrictions/conditions as defined in Table C.4. Since all data elements are mandatory and the sequence is known, the first 8 data fields are concatenated into one primitive data object. This primitive data object has Tag = '5F1F'. Vehicle categories/restrictions/conditions are encoded as a constructed data object with Tag = '7F63'.

Table C.4 — Data Group 1

Tag	Length	Value
'5F1F'	X	Primitive data object of mandatory demographic data elements. Refer to Table C.5.
'7F63'	X	Constructed data object of vehicle categories/ restrictions/conditions. Refer to Table C.6.

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C.4.2.2 Mandatory demographic data Tag = '5F1F'

Table C.5 specifies the fields that comprise the primitive data object. Each variable length field is preceded by its length (specified using ASN.1 notation). The object thus has the following structure:

[family name field length] [family name] [given names field length] [given names] [date of birth] [date of issue] [date of expiry] [issuing country] [issuing authority field length] [issuing authority] [licence number field length] [licence number]

NOTE No delimiters are used between the fields.

Table C.5 — Mandatory demographic data

Name	Fixed/ variable	Value format	Example
Family name	V	36AS	Smithe-Williams
Given[a] names	V	36AS	Alexander George Thomas
Date of birth (yyyymmdd)	F	8N	19700301
Date of issue (same format as date of birth)	F	8N	20020915
Date of expiry (same format as date of birth)	F	8N	20070930
Issuing country (shall be in accordance with ISO 3166-1)	F	3A	JPN
Issuing Authority	V	65ANS	HOKKAIDO PREFECTURAL PUBLIC SAFETY COMMISSION
Licence number	V	25AN	A290654395164273X

NOTE 1 Note the difference between the Issuing Country code specified in ISO 3166-1, and the Issuing Country code appearing in Zone I of an IDL as specified in ISO/IEC 18013-1:2018, Annex F.

NOTE 2 Value format refers to status before encoding.

[a] No titles and/or suffixes shall be included.

C.4.2.3 Categories of vehicles/restrictions/conditions — Tag = '7F63'

The following general format is adhered to:

'Tag' 'Overall Length'

'Number of Entries'

'Tag' 'Length' 'Category of vehicle/restriction/condition data object$_1$'

'Tag' 'Length' 'Category of vehicle/restriction/condition data object$_2$'

'Tag' 'Length' 'Category of vehicle/restriction/condition data object$_n$'

Each category of vehicle/restriction/condition data object entry is a variable length data element of ADNS format and constructed as specified in Annex A. All delimiters are included regardless of whether or not the associated optional fields are present. Table C.6 specifies the structure for the number of entries and the individual entries. The number of entries is denoted immediately after the total length of Tag '7F63.' Each entry is labelled with a Tag '87'. The length of the entry immediately follows its tag.

Table C.6 — Categories of vehicles/restrictions/conditions

Tag	Length	Value
'02'	'01'	Integer (N) — Number of entries
'87'	X	Category of vehicle/restriction/condition data object, repeated for each category/ restriction/ condition listed

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EXAMPLE 1

The licence holder may drive category A1 and C1 vehicles. The licence categories were issued on 1990/NOV/23 and 2003/MAY/31 respectively. The expiry date is 2013/JUN/15 for both categories. The driver requires eyesight correction for both categories, and the following supplementation details and restrictions are applicable to each of the subcategories:

Category A1: Maximum cylinder capacity of 250 cm^3

Category C1: Maximum authorized mass less than 8 000 kg, and restricted to vehicles with automatic transmission

This will be coded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'*7F 63*' '4C'
'*02*' '01' '04'
'*87*' '17' A1;'19 90 11 23';'20 13 06 15';S03;<=;'32 35 30'
'*87*' '17' C1;'20 03 05 31';'20 13 06 15';S01;<;'38 30 30 30'
'*87*' '09' C1;;;78;;
'*87*' '0A' ALL;;;01;;

where

'*7F 63*'	=	vehicle category/restrictions/conditions tag;
'4C'	=	length of the data following the tag (71_{10});
'*02*' '01' '04'	=	four data objects are contained in the tag, with the number of objects encoded using BCD;
'*87*'...35 30	=	first category of vehicle/restriction/condition data object; licensed for category A1 vehicles not exceeding 250 cm^3 from 23 November 1990 to 15 June 2013;
'*87*'...30 30	=	second category of vehicle/restriction/condition data object; category C1 vehicles of less than 8 000 kg valid from 31 May 2003 to 15 June 2013;
'*87*'...78;;	=	third category of vehicle/restriction/condition data object; category C1 vehicles restricted to automatic transmission;
'*87*'...01;;	=	fourth category of vehicle/restriction/condition data object; driver (i.e. all categories) requires sight correction and/or protection.

EXAMPLE 2

The example data noted in Table C.5 can be coded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'*61*' '81 9A'
'*5F 1F*' '77' '0F' Smithe-Williams '17' Alexander George Thomas '19 70 03 01 20 02 09 15 20 07 09 30' JPN '2D' HOKKAIDO PREFECTURAL PUBLIC SAFETY COMMISSION '11' A290654395164273X
'*7F 63*' '1D'
'*02*' '01' '01'
'*87*' '18' C1;'20 00 03 15';'20 10 03 14';S01;<=;'38 30 30 30'

where

'*61*'	=	Tag for Data Group 1;
'81 9A'	=	Overall length of data group (154_{10} = '81 9A');
'*5F 1F*'	=	Tag for mandatory demographic data;
'77'	=	Overall length of demographic data (119_{10} = '77');
'0F'	=	Length of variable length family name(s) (15_{10} = '0F');
Sm...ams	=	Value of family name(s) field;
'17'	=	Length of variable length given name(s) (23_{10} = '17');
Alex..mas	=	Value of given name(s) field;
'19 70 03 01'	=	Date of birth field (BCD encoded);

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'20 02 09 15'	=	Date of issue field (BCD encoded);
'20 07 09 30'	=	Date of expiry field (BCD encoded);
JPN	=	Issuing country field;
'2D'	=	Length of variable length Issuing Authority field (45_{10} = '2D');
HOK...ION	=	Issuing Authority field;
'11'	=	Length of variable length licence number (17_{10} = '11');
A290...X	=	Value of licence number field;
'*7F 63*'	=	Tag for categories/restrictions data object;
'1D'	=	Overall length of categories/restrictions (29_{10} = '1D');
'*02*'	=	Tag for integer;
'01'	=	Length of number of entries (1_{10} = '01');
'01'	=	Number of entries (BCD encoded);
'*87*'	=	Tag for first entry;
'18'	=	Length of first entry (24_{10} = '18');
C1;	=	Vehicle category C1 field and delimiter;
'20 00 03 15';	=	Date of issue field (BCD encoded) and delimiter;
'20 10 03 14';	=	Date of expiry field (BCD encoded) and delimiter;
S01...'30 30'	=	Limited to vehicles with an authorised mass not exceeding 8 000 kg.

The fully encoded version of tag '*5F 1F*' is as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'*5F 1F*' '77' '0F' '53 6D 69 74 68 65 2D 57 69 6C 6C 69 61 6D 73' '17' '41 6C 65 78 61 6E 64 65 72 20 47 65 6F 72 67 65 20 54 68 6F 6D 61 73' '19 70 03 01 20 02 09 15 20 07 09 30' '4A 50 4E' '2D' '48 4F 4B 4B 41 49 44 4F 20 50 52 45 46 45 43 54 55 52 41 4C 20 50 4F 4C 49 43 45 20 41 53 41 48 49 4B 41 57 41 20 41 52 45 41 20 53 41 46 45 54 59 20 50 55 42 4C 49 43 20 43 4F 4D 4D 49 53 53 49 4F 4E' '11' '41 32 39 30 36 35 34 33 39 35 31 36 34 32 37 33 58'

The fully encoded version of tag '*7F 63*' is as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'*7F 63*' '1D' '*02*' '01' '01' '*87*' '18' '43 31 3B 20 00 03 15 3B 20 10 03 14 3B 53 30 31 3B 3C 3D 3B 38 30 30 30'

C.4.3 EF.DG2 Data Group 2, optional licence holder information, Tag = '6B', short EF identifier = '02'

Data Group 2 contains the optional information about the licence holder specified in Table C.7.

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Table C.7 — Data Group 2

Tag	Length	Value	Value format	Example
5C	X	Tag list	concatenation of tags	List of all data elements present
5F35	'01'	Gender *(*shall be in accordance with *ISO/IEC 5218)*	1N	1 (Male = 1, Female = 2)
5F64	'02'	Height (cm)	3N	172
5F65	'02'	Weight (kg)	3N	082
5F66	'03'	Eye colour[a]	3A	BLU
5F67	'03'	Hair colour[b]	3A	BAL
5F11	X	Place of birth	35ADNS[c]	Frozen Foot;Minnesota;USA
5F42	X	Normal place of residence	113ADNS[d]	471 Monica Road;201 Delta Building;Lynnwood;Gauteng;0186; South Africa

NOTE 1 ISO/IEC 18013-1 allows non-metric units to be used for the height and weight values that may appear in Zone II of an IDL.

NOTE 2 Value format refers to status before encoding.

[a] Eye colour options are BLK = Black, BLU = Blue, BRO = Brown, DIC = Dichromatic, GRY = Grey, GRN = Green, HAZ = Hazel, MAR = Maroon, PNK = Pink, UNK = Unknown

[b] Hair colour options are BAL = Bald, BLK = Black, BLN = Blond, BRO = Brown, GRY = Grey, RED = Red/Auburn, SDY = Sandy, WHI = White, UNK = Unknown

[c] Three fields delimited by the sub-field delimiter — City; State/Province or District; Country. Addresses that cannot be expressed in the defined character set shall be transliterated.

[d] Six fields delimited by the sub-field delimiter — Street address line 1 (e.g. street name and number); Street address line 2 (e.g. apartment number); City; State/Province or District; Postal Code; Country. Addresses that cannot be expressed in the defined character set shall be transliterated.

EXAMPLE

The example data noted in Table C.7 can be coded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'6B' '8180'
'5C' '0E' '5F 35 5F 64 5F 65 5F 66 5F 67 5F 11 5F 42'
'5F35' '01' 1
'5F64' '02' 172
'5F65' '02' 082
'5F66' '03' BLU
'5F67' '03' BAL
'5F11' '19' Frozen Foot;Minnesota;USA
'5F42' '45' 471 Monica Road;201 Delta Building;Lynnwood;Gauteng;0186;South Africa

where

'6B' = Tag for Data Group 2;
'8180' = Overall length of data group (128_{10});
'5C' = Tag for tag list;
'0E' = Overall length of tag list;
'5F 35...5F 42' = List of tags of data fields included in this data group;
'5F35' '01' 1 = Tag, length (of BCD encoding), gender (male). The gender will be encoded as '01';
'5F64' '02' 172 = Tag, length (of BCD encoding), height of 172 cm. The height will be encoded as '01 72';
'5F65' '02' 082 = Tag, length (of BCD encoding), weight of 82 kg. The weight will be encoded as '00 82';
'5F66' '03' BLU = Tag, length, eye colour blue. The eye colour will be encoded (using ISO/IEC 8859-1) as '42 4C 55';

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'5F67' *'03'* BAL	= Tag, length, hair colour bald. The hair colour will be encoded (using ISO/IEC 8859-1) as '42 41 4C';
'5F11' '19' 'Fro...USA	= Tag, length (25_{10}), place of birth. The place of birth will be encoded (using ISO/IEC 8859-1) as '46 72 6F 7A 65 6E 20 46 6F 6F 74 3B 4D 69 6E 6E 65 73 6F 74 61 3B 55 53 41';
'5F42' '45' '471....rica	= Tag, length (69_{10}), normal place of residence. The normal place of residence will be encoded (using ISO/IEC 8859-1) as '34 37 31 20 4D 6F 6E 69 63 61 20 52 6F 61 64 3B 32 30 31 20 44 65 6C 74 61 20 42 75 69 6C 64 69 6E 67 3B 4C 79 6E 6E 77 6F 6F 64 3B 47 61 75 74 65 6E 67 3B 30 31 38 36 3B 53 6F 75 74 68 20 41 66 72 69 63 61'.

The information will be fully encoded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'6B' *'818E'*
'5C' '0E' '5F 35 5F 64 5F 65 5F 66 5F 67 5F 11 5F 42'
'5F35' *'01'* '01'
'5F64' *'02'* '01 72'
'5F65' *'02'* '00 82'
'5F66' *'03'* '42 4C 55'
'5F67' *'03'* '42 41 4C'
'5F11' *'19'* '46 72 6F 7A 65 6E 20 46 6F 6F 74 3B 4D 69 6E 6E 65 73 6F 74 61 3B 55 53 41'
'5F42' *'45'* '34 37 31 20 4D 6F 6E 69 63 61 20 52 6F 61 64 3B 32 30 31 20 44 65 6C 74 61 20 42 75 69 6C 64 69 6E 67 3B 4C 79 6E 6E 77 6F 6F 64 3B 47 61 75 74 65 6E 67 3B 30 31 38 36 3B 53 6F 75 74 68 20 41 66 72 69 63 61'

C.4.4 EF.DG3 Data Group 3, optional issuing authority details, Tag = 6C, short EF identifier = '03'

Data Group 3 contains the optional document details specified in Table C.8. All data elements are optional. A tag list is used to indicate which data elements are present.

Table C.8 — Data Group 3

Tag	Length	Value	Value format	Examples
5C	X	Tag list	concatenation of tags	List of all data elements present
5F68	X	Administrative number	25ANS	123456789B
5F69	'01'	Document discriminator[a]	2N	01
5F6D	'01'	Data discriminator[b]	2N	01
5F6A	'04'	ISO issuer ID number[c] (shall be in accordance with ISO/IEC 7812-1)	8N	63600000

NOTE Value format refers to status before encoding.

[a] Number assigned by the issuing authority to differentiate between additional licences (documents) or duplicate documents issued bearing the same licence number as the original, that is 01 for the original licence, 02 for the first duplicate, 03 for the second duplicate and nn for the (nn-1)th duplicate.

[b] Number assigned by the issuing authority to differentiate between machine-readable data sets on the same physical document where updates have been made to machine-readable data, that is 01 for the original data set, 02 for the first update, 03 for the second update and nn for the (nn-1)th update. The data discriminator is mandatory when any change is made to the machine-readable data (see 5.2).

[c] ISO number assigned to issuing country or licensing authority, as the case may be.

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EXAMPLE

The example data noted in Table C.8 can be coded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'6C' '26'
'5C' '08' '5F 68 5F 69 5F 6D 5F 6A'
'5F68' '0A' 123456789B
'5F69' '01' 01
'5F6D' '01' 01
'5F6A' '04' 63600000

where

'6C'	= Tag for Data Group 3;
'26'	= Overall length of data group (38_{10});
'5C'	= Tag list;
'08'	= Overall length of tag list;
'5F 68...5F 6A'	= List of tags of data fields included in this data group;
'5F68' '0A' 123456789B	= Tag, length, administrative number. The administrative number will be encoded (using ISO/IEC 8859-1) as '31 32 33 34 35 36 37 38 39 41';
'5F69' '01' 01	= Tag, length (of BCD encoding), document discriminator of 01. The document discriminator will be encoded as '01';
'5F6D' '01' 01	= Tag, length (of BCD encoding), data discriminator of 01. The data discriminator will be encoded as '01';
'5F6A' '04' '63600000	= Tag, length (of BCD encoding), issuer ID number. The issuer ID number will be encoded (using BCD) as '63 60 00 00'.

C.4.5 EF.DG4 Data Group 4, optional portrait image, Tag = '65', short EF identifier = '04'

Data Group 4 contains one or more JPEG and/or WSQ images, Tag = '5F40'. The images are encoded according to the settings defined in Annex D. An integer defines the number present. Each instance is headed by an image template Tag as specified in Table C.9.

Table C.9 — Data Group 4

Tag	Length	Value		
''	'01'	Integer, number of portraits encoded		
'A2'	X	Instance of portrait template, repeated for every image included		
		Tag	**Length**	**Value**
		'88'	'07'	Portrait image timestamp
		'89'	'01'	Type of image
		'5F40'	X	JPEG shall be in accordance with ISO/IEC 10918-1, JPEG-2000 shall be in accordance with ISO/IEC 15444-1, WSQ shall be in accordance with IAFIS-IC-0110(v3), as specified in Annex D.

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EXAMPLE

Assume two portraits have been encoded. Portrait one is a JPEG image with a length of 2 035 bytes and a timestamp of 20 February 2007 14:22:23, and portrait two is a JPEG2000 image with a length of 3 698 bytes and a timestamp of 21 February 2002 (no time is available for the second portrait).

Then (spaces, underlining and italics are included for legibility only, and are not encoded),

'65' '821692'
  '02' '01' 2
  'A2' '820804'
    '88' '07' 20070220142223
    '89' '01' 3
    '5F40' '8207F3' 2035 byte JPEG image
  'A2' '820E83'
    '88' '07' 20020221000000
    '89' '01' 4
    '5F40' '820E72' 3698 byte JPEG2000 image

where

'65' '821692'	=	Tag and overall length of Data Group 4 (5778_{10});
'02' '01' 2	=	Tag, length and number of entries (2). The number of entries will be encoded as '02';
'A2' '820804'	=	Tag and length of the portrait image template;
'88' '07' 20070220142223	=	Tag, length and portrait image timestamp (BCD encoded);
'89' '01' 3	=	Tag, length and image type (3 = JPEG). The image type will be encoded as '03';
'5F40' '8207F3'...image	=	Tag for image, length and image;
'A2...image'	=	Second entry.

C.4.6 EF.DG5 Data Group 5, optional signature/mark image, Tag = '67', short EF identifier = '05'

Data Group 5 contains a signature or usual mark image, Tag = '5F43' as specified in Table C.10.

Table C.10 — Data Group 5

Tag	Length	Value
'89'	'01'	Type of image
'5F43'	X	JPEG shall be in accordance with ISO/IEC 10918-1, JPEG-2000 shall be in accordance with ISO/IEC 15444-1, WSQ shall be in accordance with IAFIS-IC-0110(v3), as specified in Annex D.

C.4.7 EF.DG6 Data Group 6, optional facial biometric template, Tag = '75', short EF identifier = '06'

Data Group 6 contains one or more facial biometric templates as defined in Table C.11. The biometric template specified in Table C.12 is encoded according to the biometric information template used for off-card matching, which shall be as defined in ISO/IEC 19785-3:2015, Clause 11. Regardless of the number of biometric templates present, the nested off-card structure defined in ISO/IEC 7816-11:2017, Table 2 shall be used.

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Table C.11 — Data Group 6

Tag	L	Value				
'75'	X	Data group & optional biometric identification ('75' for Facial, '63' for Finger, '76' for Iris, etc)				
		Tag	**L**	**Value**		
		'7F 61'	X	Biometric group template		
				Tag	**L**	**Value**
				'02'	X	Number of biometric templates in the group
				'7F 60'	X	Biometric template (see Table C.12)

Table C.12 — Biometric template

Tag	L	Value							
'7F 60'	X	Biometric template							
		Tag	**L**	**Value**					
		'A1'	X	Biometric Header Template (BHT)					
				Tag	**L**	**Value**	**Presence**	**Value format**	**Example**
				'80'	'02'	Patron header version	Mandatory (if absent, the default value applies)	2 bytes	'01 01'
				'81'	'01'–'03'	Biometric type	Optional	1-3 bytes	Facial = '02' Finger = '08' Iris = '10'
				'82'	'01'	Biometric subtype	Mandatory when applicable	1 byte	binary xx100101 for right hand thumb (given a biometric type '08') binary xx100010 for left eye (given a biometric type of '10')
				'83'	'07'	Biometric data creation date and time (yyyymmddhhmmss)[a]	Optional	14N	20031215173530, representing December 15, 2003, 5:35:30 PM
				'84'	X	BIR creator	Optional	ANS	Hokkaido Prefectural Police Asahikawa Area Public Safety Commission
				'85'	'08'	BDB validity period (yyyymmddyyyymmdd)[b]	Optional	16N	2003121520081214, representing a validity period from December 15, 2003 to December 14, 2008
				'86'	'04'	BDB product owner, product type	Optional	4 bytes (a concatenation of two 16 bit positive integers of value 1 to 65 535)	'00 01 00 82'
				'87'	'02'	BDB format owner	Mandatory	2 byte non-negative integer of value 1 to 65 535	'01 01'
				'88'	'02'	BDB format type	Mandatory	2 byte non-negative integer of value 1 to 65 535	'00 09'

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Table C.12 *(continued)*

Tag	L	Value							
		Tag	L	Value					
				Tag	L	Value	Presence	Value format	Example
				'90'	X	BIR index (unique identifier used to reference the biometric data set in an application context outside the IDL	Optional	Free format	RecId_1952686A67
		'5F2E' or '7F2E'	X	Biometric data block This data is normally stored in the clear in '5F2E', but it may be enciphered and stored in template '7F2E'.			Mandatory	Format and encoding as specified by BDB format owner and type.	Finger minutia record as specified in ISO/IEC 19794-2:2005, Clause 7
		'53'/'73'	X	BIR payload			Optional		Arbitrary domestic data

NOTE Value format refers to status before encoding.

[a] If hour, minute, second are not available, 00 shall be used for each value.

[b] Two concatenated dates where the first date is the "from date" (not before), and the second date is the "to date" (not after).

EXAMPLE

Two biometric templates as follows (Template 1 from ISO/IEC JTC 1/SC 37 and Template 2 from ANSI INCITS Technical Committee M1):

Template 1: Facial biometric, created 15 December 2003 at 5:35:30pm, valid from 15 December 2003 through 14 December 2008, product owner number = 1, product type number = 130, format owner number = 257 ('01 01'), format type number = 8, biometric data block length = 12634 bytes.

Template 2: Facial biometric, created 7 January 1999 at 10:27:44am, valid from 7 January 1999 through 6 January 2004, product owner number = 1, product type number = 130, format owner number = 27 ('00 1B'), format type number = 1281 ('05 01"), biometric data block length = 12711 bytes.

Then (spaces, underlining and italics are included for legibility only, and are not encoded),

'75' *'82 63 71'*
'7F 61' *'82 63 6C'*
'02' *'01'* '02'
'7F 60' *'82 31 89'*
'A1' *'28'*
'80' *'02'* '01 01'
'81' *'01'* '02'
'83' *'07'* '20 03 12 15 17 35 30'
'85' *'08'* '20 03 12 15 20 08 12 14'
'86' *'04'* '00 01 00 82'
'87' *'02'* '01 01'
'88' *'02'* '00 08'
'5F 2E' *'82 31 5A'* '.....12634 byte Biometric Data Block....'
'7F 60' *'82 31 D6'*
'A1' *'28'*
'80' *'02'* '01 01'
'81' *'01'* '02'
'83' *'07'* '19 99 01 07 10 27 44'
'85' *'08'* '19 99 01 07 20 04 01 06'
'86' *'04'* '00 01 00 82'
'87' *'02'* '00 1B'
'88' *'02'* '05 01'
'5F 2E' *'82 31 A7'* '.....12711 byte Biometric Data Block....'

where

'75' = Tag for DG6, Optional facial biometric;
'82 63 71' = Overall length of data group (25457_{10} = '82 63 71');
'7F 61' = Tag for biometric group template;

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'82 63 6C'	=	Overall length of biometric group (25452_{10} = '82 63 6C');
'*02*' '01' '02'	=	Number of entries;
'*7F 60*'	=	Tag for biometric template;
'82 31 89'	=	Overall length of biometric template (12681_{10} = '82 31 89');
'*A1*' '28'	=	Biometric header tag and length (40_{10} = '28');
'*80*' '02' '01 01'	=	Patron version ;
'*81*' '01' '02'	=	Facial biometric type;
'*83*' '07' 20031215173530	=	Date and time of creation 15 December 2003. This will be encoded as '20 03 12 15 17 35 30' (BCD encoded);
'*85*' '08' 2003121520081214	=	Validity period. This will be encoded as '20 03 12 15 20 08 12 14' (BCD encoded);
'*86*' '04' '00 01 00 82'	=	Product owner and type (130_{10} = '82');
'*87*' '02' '01 01'	=	Format owner ('01 01' = registered value for ISO/IEC JTC 1/SC 37, *Biometrics*);
'*88*' '02' '00 08'	=	Format type ('00 08' = registered value for face-image conforming to ISO/IEC 19794-5);
'*5F 2E*' '82 31 5A'	=	Length of biometric data block (12634_{10} = '82 31 5A');
..Biometric..	=	Biometric data block encoded per above defined owner and format;
'*7F 60*'	=	Tag for biometric template;
'82 31 D6'	=	Overall length of biometric template (12758_{10} = '82 31 D6');
'*A1*' '2B'	=	Biometric header tag and length (43_{10} = '2B');
'*80*' '02' '01 01'	=	Patron version ;
'*81*' '01' '02'	=	Facial biometric type;
'*83*' '07' 19990107102744	=	Date and time of creation 7 January 1999 at 10:27:44am. This will be encoded as '19 99 01 07 10 27 44' (BCD encoded);
'*85*' '08' 1999010720040106	=	Validity period, from 7 January 1999 through 6 January 2004. This will be encoded as '19 99 01 07 20 04 01 06' (BCD encoded);
'*86*' '04' '00 01 00 82'	=	Product owner and type;
'*87*' '02' '00 1B'	=	Format owner ('00 1B' = registered value for INCITS Technical Committee M1);
'*88*' '02' '05 01'	=	Format type ('05 01' = registered value for ANSI INCITS 385-2004);
'*5F 2E*' '82 31 A7'	=	Length of biometric data block (12711_{10} = '82 31 A7');
..Biometric..	=	Biometric data block encoded per above defined owner and format.

The information will be fully encoded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

'*75* 82 63 71 *7F 61* 82 63 6C *02* 01 02 *7F 60* 82 31 89 *A1* 28 *80* 02 01 01 *81* 01 02 *83* 07 20 03 12 15 17 35 30 *85* 08 20 03 12 15 20 08 12 14 *86* 04 00 01 00 82 *87* 02 01 01 *88* 02 00 08 *5F 2E* 82 31 5A <12634 byte Biometric Data Block> *7F 60* 82 31 D6 *A1* 2B *80* 02 01 01 *81* 01 02 *83* 07 19 99 01 07 10 27 44 *85* 08 19 99 01 07 20 04 01 06 *86* 04 00 01 00 82 *87* 02 00 1B *88* 02 05 01 *5F 2E* 82 31 A7 <12711 byte Biometric Data Block>'

NOTE Tags for biometric templates are defined and assigned in ISO/IEC 7816-11. Any tag in the above example that is not listed in Table C.12 originates from ISO/IEC 7816-11.

C.4.8 EF.DG7 Data Group 7, optional finger biometric, Tag = '63', short EF identifier = '07'

Data Group 7 is encoded the same as Data Group 6. Specific data elements will have different values as the biometric is for fingers rather than faces, which shall be in accordance with ISO/IEC 19794-4:2005.

EXAMPLE

Finger biometric (right hand thumb), created 15 December 2003 at 5:36:12pm, valid from 15 December 2003 through 14 December 2008, product owner number = 13, product type number = 99, format owner number = 257, format type number = 7, biometric data block length = 834 bytes.

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Then (spaces, underlining and italics are included for legibility only, and are not encoded),

‘*63*’ ’82 03 81’
’*7F 61*’ ’82 03 7C’
’*02*’ ’01’ '01'
’*7F 60*’ ’82 03 74’
’*A1*’ ’2B’
’*80*’ ’02’ ’01 01’
’*81*’ ’01’ ’08’
’*82*’ ’01’ ’05’
’*83*’ ’07’ ’20 03 12 15 17 36 12’
’*85*’ ’08’ ’20 03 12 15 20 08 12 14’
’*86*’ ’04’ ’00 0D 00 63’
’*87*’ ’02’ ’01 01’
’*88*’ ’02’ ’00 07'
’*5F 2E*’ ’82 03 42’ '.....834 byte Biometric Data Block....'

where

‘*63*’	=	Tag for DG7, Optional finger biometric;
‘82 03 81’	=	Overall length of data group (897_{10} = '82 03 81');
‘*7F 61*’	=	Tag for biometric group template;
‘82 03 7C’	=	Overall length of biometric group (892_{10} = '82 03 7C');
'*02*' '01' '01'	=	Number of entries;
‘*7F 60*’	=	Tag for biometric template;
‘82 03 74’	=	Overall length of biometric template (884_{10} = '82 03 74');
‘*A1*’ '2B'	=	Biometric header tag and length (43_{10} = '2B');
'*80*' '02' ’01 01’	=	Patron version ;
'*81*' '01' ’08’	=	Finger biometric type;
'*82*' '01' ‘05’	=	Biometric subtype: right hand thumb;
'*83*' '07' 20031215173612	=	Date and time of creation 15 December 2003 5:36:12pm. This will be encoded as ‘20 03 12 15 17 36 12’ (BCD encoded);
'*85*' '08' 2003121520081214	=	Validity period, from 15 December 2003 through 14 December 2008. This will be encoded as ‘20 03 12 15 20 08 12 14’ (BCD encoded);
'*86*' '04' ‘00 0D 00 63’	=	Product owner and type (13_{10} = '0D', 99_{10} = '63');
'*87*' '02' ‘01 01’	=	Format owner (257_{10} = '01 01', registered value for ISO/IEC JTC 1/SC 37, *Biometrics*);
'*88*' '02' ‘00 07’	=	Format type (7_{10} = '00 07', registered value for finger-image conforming to ISO/IEC 19794-4);
'*5F 2E*' ‘82 03 42’	=	Length of biometric data block (834_{10} = '82 03 42');
..Biometric..	=	Biometric data block encoded per above defined owner and format.

The information will be fully encoded as follows (spaces, underlining and italics are included for legibility only, and are not encoded):

‘*63* 82 03 81 *7F 61* 82 03 7C *02* 01 01 *7F 60* 82 03 74 *A1* 2B *80* 02 01 01 *81* 01 08 *82* 01 05 *83* 07 20 03 12 15 17 36 12 *85* 08 20 03 12 15 20 08 12 14 *86* 04 00 0D 00 63 *87* 02 01 01 *88* 02 00 07 *5F 2E* 82 03 42 <834 byte Biometric Data Block>’

NOTE Tags for biometric templates are defined and assigned in ISO/IEC 7816-11. Any tag in the above example that is not listed in Table C.11 originates from ISO/IEC 7816-11.

C.4.9 EF.DG8 Data Group 8, optional iris biometric, Tag = ‘76’, short EF identifier = '08'

Data Group 8 is encoded the same as Data Group 6. Specific data elements will have different values as the biometric is for irises rather than faces, which shall be in accordance with ISO/IEC 19794-6:2005.

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C.4.10 EF.DG9 Data Group 9, optional other biometric, Tag = '70', short EF identifier = '09'

Data Group 9 is encoded the same as Data Group 6. Specific data elements will have different values as the biometric is not for faces.

C.4.11 EF.DG10 Data Group 10, reserved for future use, no Tag assigned, short EF identifier = '0A'

This data group is reserved for future use and the content will be defined at a future stage.

C.4.12 EF.DG11 Data Group 11, optional domestic data, Tag = '6D', short EF identifier = '0B'

This data group is reserved for domestic use and hence the encoding is defined domestically.

C.5 Use of basic encoding rules of ASN.1

C.5.1 BER-TLV data object

Each BER-TLV data object shall consist of 2 or 3 consecutive fields in accordance with ISO/IEC 8825-1.

— The tag field T consists of one or more consecutive bytes. It encodes a class, a type and a number.

— The length field consists of one or more consecutive bytes. It encodes an integer L.

— If L is not null, then the value field V consists of L consecutive bytes. If L is null, then the data object is empty: there is no value field.

Neither '00' nor 'FF' is used as tag values.

NOTE Before, between or after BER-TLV data objects, '00' or 'FF' bytes without any meaning may occur (e.g., due to erased or modified TLV-coded data objects).

C.5.2 Tag field

The bits b8 and b7 of the leading byte of the tag field shall encode the tag class, i.e., the class of the data object.

— b8-b7=00 introduces a tag of universal class.

— b8-b7=01 introduces a tag of application class.

— b8-b7=10 introduces a tag of context-specific class.

— b8-b7=11 introduces a tag of private class.

The bit b6 of the leading byte of the tag field shall encode the tag type, i.e. the type of the data object.

— b6=0 introduces a primitive data object.

— b6=1 introduces a constructed data object.

If the bits b5 to b1 of the leading byte are not all set to 1, then they shall encode an integer equal to the tag number which therefore lies in the range from 0 to 30. Then the tag field consists of a single byte.

Otherwise (b5 to b1 set to 1 in the leading byte), the tag field shall continue on one or more subsequent bytes.

— The bit b8 of each subsequent byte shall be set to 1, unless it is the last subsequent byte.

— The bits b7 to b1 of the first subsequent byte shall not be all set to 0.

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— The bits b7 to b1 of the first subsequent byte, followed by the bits b7 to b1 of each further subsequent byte, up to and including the bits b7 to b1 of the last subsequent byte, shall encode an integer equal to the tag number (thus strictly positive).

C.5.3 Length field

In short form, the length field consists of a single byte where the bit b8 shall be set to 0 and the bits b7 to b1 shall encode an integer equal to the number of bytes in the value field. Any length from 0 to 127 can thus be encoded by 1 byte. In long form, the length field consists of a leading byte where the bit b8 shall be set to 1 and the bits b7 to b1 shall not be all equal, thus encoding a positive integer equal to the number of subsequent bytes in the length field. Those subsequent bytes shall encode an integer equal to the number of bytes in the value field. Any length within the APDU limit (up to 65 535) can thus be encoded by 3 bytes as defined in Table C.13.

NOTE The ISO/IEC 7816 series does not use the indefinite lengths specified by the basic encoding rules of ASN.1 (see ISO/IEC 8825-1).

Table C.13 — ASN.1 Length encoding rules

Range	# of bytes	1st byte	2nd byte	3rd byte
0 to 127	1	binary value	none	None
128 to 255	2	'81'	binary value	None
256 to 65 535	3	'82'	binary value	
			most significant byte	least significant byte

C.6 List of tags used

'53' EF.CE — Compact encoded object

'5C' Tag list

'5F01' LDS version number

'5F11' Place of birth

'5F1F' Data object of mandatory demographic data objects

'5F2E' Biometric data block

'5F35' Gender

''5F40' Portrait image

'5F42' Place of residence

'5F43' Signature/mark image

'5F64' Height

'5F65' Weight

'5F66' Eye colour

'5F67' Hair colour

'5F68' Administrative number

'5F69' Document discriminator

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