
**Information technology — ASN.1
encoding rules: Specification of
Encoding Control Notation (ECN)**

*Technologies de l'information — Règles de codage ASN.1:
Spécification de la notation de contrôle de codage (ECN)*



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This third edition cancels and replaces the second edition of ISO/IEC 8825-3:2008 which has been technically revised. It also incorporates ISO/IEC 8825-3:2008/Cor.1:2012.

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SERIES X: DATA NETWORKS, OPEN SYSTEM
COMMUNICATIONS AND SECURITY

OSI networking and system aspects – Abstract Syntax
Notation One (ASN.1)

**Information technology – ASN.1 encoding rules:
Specification of Encoding Control Notation
(ECN)**

Recommendation ITU-T X.692



ITU-T X-SERIES RECOMMENDATIONS
DATA NETWORKS, OPEN SYSTEM COMMUNICATIONS AND SECURITY

PUBLIC DATA NETWORKS	
Services and facilities	X.1–X.19
Interfaces	X.20–X.49
Transmission, signalling and switching	X.50–X.89
Network aspects	X.90–X.149
Maintenance	X.150–X.179
Administrative arrangements	X.180–X.199
OPEN SYSTEMS INTERCONNECTION	
Model and notation	X.200–X.209
Service definitions	X.210–X.219
Connection-mode protocol specifications	X.220–X.229
Connectionless-mode protocol specifications	X.230–X.239
PICS proformas	X.240–X.259
Protocol Identification	X.260–X.269
Security Protocols	X.270–X.279
Layer Managed Objects	X.280–X.289
Conformance testing	X.290–X.299
INTERWORKING BETWEEN NETWORKS	
General	X.300–X.349
Satellite data transmission systems	X.350–X.369
IP-based networks	X.370–X.379
MESSAGE HANDLING SYSTEMS	
DIRECTORY	X.500–X.599
OSI NETWORKING AND SYSTEM ASPECTS	
Networking	X.600–X.629
Efficiency	X.630–X.639
Quality of service	X.640–X.649
Naming, Addressing and Registration	X.650–X.679
Abstract Syntax Notation One (ASN.1)	X.680–X.699
OSI MANAGEMENT	
Systems management framework and architecture	X.700–X.709
Management communication service and protocol	X.710–X.719
Structure of management information	X.720–X.729
Management functions and ODMA functions	X.730–X.799
SECURITY	X.800–X.849
OSI APPLICATIONS	
Commitment, concurrency and recovery	X.850–X.859
Transaction processing	X.860–X.879
Remote operations	X.880–X.889
Generic applications of ASN.1	X.890–X.899
OPEN DISTRIBUTED PROCESSING	X.900–X.999
INFORMATION AND NETWORK SECURITY	X.1000–X.1099
SECURE APPLICATIONS AND SERVICES	X.1100–X.1199
CYBERSPACE SECURITY	X.1200–X.1299
SECURE APPLICATIONS AND SERVICES	X.1300–X.1399
CYBERSECURITY INFORMATION EXCHANGE	X.1500–X.1599
CLOUD COMPUTING SECURITY	X.1600–X.1699

For further details, please refer to the list of ITU-T Recommendations.

**Information technology – ASN.1 encoding rules:
Specification of Encoding Control Notation (ECN)**

Summary

Recommendation ITU-T X.692 | ISO/IEC 8825-3 defines the Encoding Control Notation (ECN) used to specify encodings (of ASN.1 types) that differ from those provided by standardized encoding rules such as the Basic Encoding Rules (BER) and the Packed Encoding Rules (PER).

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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CONTENTS

Page

Introduction	x
Information technology – ASN.1 encoding rules: Specification of Encoding Control Notation (ECN)	1
1 Scope	1
2 Normative references.....	1
2.1 Identical Recommendations International Standards	1
2.2 Additional references	2
3 Definitions.....	2
3.1 ASN.1 definitions.....	2
3.2 ECN-specific definitions	2
4 Abbreviations	5
5 Definition of ECN syntax.....	5
6 Encoding conventions and notation.....	5
7 The ECN character set.....	5
8 ECN lexical items.....	6
8.1 Encoding object references	6
8.2 Encoding object set references	6
8.3 Encoding class references	7
8.4 Reserved word items	7
8.5 Reserved encoding class name items	7
8.6 Non-ECN item	7
9 ECN Concepts	8
9.1 Encoding Control Notation (ECN) specifications	8
9.2 Encoding classes	8
9.3 Encoding structures	9
9.4 Encoding objects	9
9.5 Encoding object sets.....	9
9.6 Defining new encoding classes	10
9.7 Defining encoding objects.....	11
9.8 Differential encoding-decoding.....	11
9.9 Encoders options in encodings	12
9.10 Properties of encoding objects	12
9.11 Parameterization.....	12
9.12 Governors.....	13
9.13 General aspects of encodings	13
9.14 Identification of information elements	14
9.15 Reference fields and determinants	14
9.16 Replacement classes and structures.....	14
9.17 Mapping abstract values onto fields of encoding structures.....	15
9.18 Transforms and transform composites	16
9.19 Contents of Encoding Definition Modules.....	16
9.20 Contents of the Encoding Link Module	17
9.21 Defining encodings for primitive encoding classes.....	17
9.22 Application of encodings	19
9.23 Combined encoding object set	19
9.24 Application point.....	19
9.25 Conditional encodings.....	20
9.26 Other conditions for applying encodings	20
9.27 Encoding control for the open type	21
9.28 Changes to ASN.1 Recommendations International Standards.....	21

10	Identifying encoding classes, encoding objects, and encoding object sets	21
11	Encoding ASN.1 types	24
	11.1 General	24
	11.2 Built-in encoding classes used for implicitly generated encoding structures	25
	11.3 Simplification and expansion of ASN.1 notation for encoding purposes	25
	11.4 The implicitly generated encoding structure	27
12	The Encoding Link Module (ELM).....	28
	12.1 Structure of the ELM.....	28
	12.2 Encoding types	28
13	Application of encodings	29
	13.1 General	29
	13.2 The combined encoding object set and its application	29
14	The Encoding Definition Module (EDM)	32
15	The renames clause.....	33
	15.1 Explicitly generated and exported structures.....	33
	15.2 Name changes	34
	15.3 Specifying the region for name changes	35
16	Encoding class assignments.....	36
	16.1 General	36
	16.2 Encoding structure definition	39
	16.3 Alternative encoding structure	42
	16.4 Repetition encoding structure.....	43
	16.5 Concatenation encoding structure	43
17	Encoding object assignments.....	44
	17.1 General	44
	17.2 Encoding with a defined syntax	44
	17.3 Encoding with encoding object sets	45
	17.4 Encoding using value mappings.....	46
	17.5 Encoding an encoding structure	46
	17.6 Differential encoding-decoding.....	48
	17.7 Encoding options.....	49
	17.8 Non-ECN definition of encoding objects	50
18	Encoding object set assignments	50
	18.1 General	50
	18.2 Built-in encoding object sets	51
19	Mapping values	52
	19.1 General.....	52
	19.2 Mapping by explicit values	53
	19.3 Mapping by matching fields.....	54
	19.4 Mapping by #TRANSFORM encoding objects	55
	19.5 Mapping by abstract value ordering.....	56
	19.6 Mapping by value distribution	57
	19.7 Mapping integer values to bits	58
20	Defining encoding objects using defined syntax	59
21	Types used in defined syntax specification	60
	21.1 The Unit type	60
	21.2 The EncodingSpaceSize type.....	60
	21.3 The EncodingSpaceDetermination type.....	61
	21.4 The UnusedBitsDetermination type.....	61
	21.5 The OptionalityDetermination type	62
	21.6 The AlternativeDetermination type	63
	21.7 The RepetitionSpaceDetermination type	63
	21.8 The Justification type	64

21.9	The Padding type	65
21.10	The Pattern and Non-Null-Pattern types	65
21.11	The RangeCondition type	66
21.12	The Comparison type	66
21.13	The SizeRangeCondition type	67
21.14	The ReversalSpecification type	67
21.15	The ResultSize type	68
21.16	The HandleValueSet type	68
21.17	The IntegerMapping type	69
22	Commonly used encoding property groups	69
22.1	Replacement specification	69
22.1.1	Encoding properties, syntax and purpose	69
22.1.2	Specification restrictions	70
22.1.3	Encoder actions	71
22.1.4	Decoder actions	72
22.2	Pre-alignment and padding specification	72
22.2.1	Encoding properties, syntax and purpose	72
22.2.2	Specification constraints	72
22.2.3	Encoder actions	73
22.2.4	Decoder actions	73
22.3	Start pointer specification	73
22.3.1	Encoding properties, syntax and purpose	73
22.3.2	Specification constraints	73
22.3.3	Encoder actions	73
22.3.4	Decoder actions	74
22.4	Encoding space specification	74
22.4.1	Encoding properties, syntax and purpose	74
22.4.2	Specification restrictions	75
22.4.3	Encoder actions	75
22.4.4	Decoder actions	76
22.5	Optionality determination	76
22.5.1	Encoding properties, syntax and purpose	76
22.5.2	Specification restrictions	76
22.5.3	Encoder actions	77
22.5.4	Decoder actions	77
22.6	Alternative determination	78
22.6.1	Encoding properties, syntax and purpose	78
22.6.2	Specification restrictions	78
22.6.3	Encoder actions	79
22.6.4	Decoder actions	79
22.7	Repetition space specification	79
22.7.1	Encoding properties, syntax and purpose	79
22.7.2	Specification constraints	80
22.7.3	Encoder actions	81
22.7.4	Decoder actions	82
22.8	Value padding and justification	82
22.8.1	Encoding properties, syntax, and purpose	82
22.8.2	Specification restrictions	83
22.8.3	Encoder actions	83
22.8.4	Decoder actions	84
22.9	Identification handle specification	84
22.9.1	Encoding properties, syntax and purpose	84
22.9.2	Specification constraints	85
22.9.3	Encoders actions	85
22.9.4	Decoders actions	85
22.10	Concatenation specification	86
22.10.1	Encoding properties, syntax and purpose	86
22.10.2	Specification constraints	86
22.10.3	Encoder actions	86
22.10.4	Decoder actions	87

22.11	Contained type encoding specification.....	87
22.11.1	Encoding properties, syntax and purpose.....	87
22.11.2	Encoder actions.....	87
22.11.3	Decoder actions.....	87
22.12	Bit reversal specification.....	87
22.12.1	Encoding properties, syntax, and purpose.....	87
22.12.2	Specification constraints.....	88
22.12.3	Encoder actions.....	88
22.12.4	Decoder actions.....	88
23	Defined syntax specification for bit-field and constructor classes.....	88
23.1	Defining encoding objects for classes in the alternatives category.....	88
23.1.1	The defined syntax.....	88
23.1.2	Purpose and restrictions.....	89
23.1.3	Encoder actions.....	89
23.1.4	Decoder actions.....	90
23.2	Defining encoding objects for classes in the bitstring category.....	90
23.2.1	The defined syntax.....	90
23.2.2	Model for the encoding of classes in the bitstring category.....	91
23.2.3	Purpose and restrictions.....	91
23.2.4	Encoder actions.....	92
23.2.5	Decoder actions.....	92
23.3	Defining encoding objects for classes in the boolean category.....	92
23.3.1	The defined syntax.....	92
23.3.2	Purpose and restrictions.....	94
23.3.3	Encoder actions.....	94
23.3.4	Decoder actions.....	94
23.4	Defining encoding objects for classes in the characterstring category.....	95
23.4.1	The defined syntax.....	95
23.4.2	Model for the encoding of classes in the characterstring category.....	95
23.4.3	Purpose and restrictions.....	96
23.4.4	Encoder actions.....	96
23.4.5	Decoder actions.....	97
23.5	Defining encoding objects for classes in the concatenation category.....	97
23.5.1	The defined syntax.....	97
23.5.2	Purpose and restrictions.....	98
23.5.3	Encoder actions.....	99
23.5.4	Decoder actions.....	99
23.6	Defining encoding objects for classes in the integer category.....	99
23.6.1	The defined syntax.....	99
23.6.2	Purpose and restrictions.....	99
23.6.3	Encoder actions.....	100
23.6.4	Decoder actions.....	100
23.7	Defining encoding objects for the #CONDITIONAL-INT class.....	100
23.7.1	The defined syntax.....	100
23.7.2	Purpose and restrictions.....	101
23.7.3	Encoder actions.....	102
23.7.4	Decoder actions.....	103
23.8	Defining encoding objects for classes in the null category.....	103
23.8.1	The defined syntax.....	103
23.8.2	Purpose and restrictions.....	105
23.8.3	Encoder actions.....	105
23.8.4	Decoder actions.....	105
23.9	Defining encoding objects for classes in the octetstring category.....	105
23.9.1	The defined syntax.....	105
23.9.2	Model for the encoding of classes in the octetstring category.....	106
23.9.3	Purpose and restrictions.....	106
23.9.4	Encoder actions.....	107
23.9.5	Decoder actions.....	107
23.10	Defining encoding objects for classes in the open type category.....	108
23.10.1	The defined syntax.....	108
23.10.2	Model for the encoding of classes in the open type category.....	109

23.10.3	Purpose and restrictions	109
23.10.4	Encoder actions	109
23.10.5	Decoder actions	110
23.11	Defining encoding objects for classes in the optionality category	110
23.11.1	The defined syntax	110
23.11.2	Purpose and restrictions	111
23.11.3	Encoder actions	111
23.11.4	Decoder actions	111
23.12	Defining encoding objects for classes in the pad category	111
23.12.1	The defined syntax	111
23.12.2	Purpose and restrictions	112
23.12.3	Encoder actions	113
23.12.4	Decoder actions	113
23.13	Defining encoding objects for classes in the repetition category	113
23.13.1	The defined syntax	113
23.13.2	Purpose and restrictions	113
23.13.3	Encoder actions	114
23.13.4	Decoder actions	114
23.14	Defining encoding objects for the #CONDITIONAL-REPETITION class	114
23.14.1	The defined syntax	114
23.14.2	Purpose and restrictions	115
23.14.3	Encoder actions	116
23.14.4	Decoder actions	116
23.15	Defining encoding objects for classes in the tag category	117
23.15.1	The defined syntax	117
23.15.2	Purpose and restrictions	118
23.15.3	Encoder actions	118
23.15.4	Decoder actions	119
23.16	Defining encoding objects for classes in the other categories	119
24	Defined syntax specification for the #TRANSFORM encoding class	119
24.1	Summary of encoding properties and defined syntax	119
24.2	Source and target of transforms	121
24.3	The int-to-int transform	122
24.4	The bool-to-bool transform	123
24.5	The bool-to-int transform	124
24.6	The int-to-bool transform	124
24.7	The int-to-chars transform	124
24.8	The int-to-bits transform	125
24.9	The bits-to-int transform	126
24.10	The char-to-bits transform	127
24.11	The bits-to-char transform	129
24.12	The bit-to-bits transform	129
24.13	The bits-to-bits transform	130
24.14	The chars-to-composite-char transform	130
24.15	The bits-to-composite-bits transform	131
24.16	The octets-to-composite-bits transform	131
24.17	The composite-char-to-chars transform	131
24.18	The composite-bits-to-bits transform	131
24.19	The composite-bits-to-octets transform	132
25	Complete encodings and the #OUTER class	132
25.1	Encoding properties, syntax and purpose for the #OUTER class	132
25.2	Encoder actions for #OUTER	133
25.3	Decoder actions for #OUTER	133
Annex A	Addendum to Rec. ITU-T X.680 ISO/IEC 8824-1	135
A.1	Exports and imports clauses	135
A.2	Addition of REFERENCE	136
A.3	Notation for character string values	136

Annex B Addendum to Rec. ITU-T X.681 ISO/IEC 8824-2	137
B.1 Definitions	137
B.2 Additional lexical items	137
B.2.1 Ordered value list field references	137
B.2.2 Ordered encoding object list field references	137
B.2.3 Encoding class field references	137
B.3 Addition of "ENCODING-CLASS"	137
B.4 FieldSpec additions	138
B.5 Fixed-type ordered value list field spec	138
B.6 Fixed-class encoding object field spec	138
B.7 Variable-class encoding object field spec	138
B.8 Fixed-class encoding object set field spec	139
B.9 Fixed-class ordered encoding object list field spec	139
B.10 Encoding class field spec	139
B.11 Ordered value list notation	140
B.12 Ordered encoding object list notation	140
B.13 Primitive field names	140
B.14 Additional reserved words	140
B.15 Definition of encoding objects	141
B.16 Additions to "Setting"	141
Annex C Addendum to Rec. ITU-T X.683 ISO/IEC 8824-4	143
D.1 General examples	146
D.1.1 An encoding object for a boolean type	146
D.1.2 An encoding object for an integer type	147
D.1.3 Another encoding object for an integer type	147
D.1.4 An encoding object for an integer type with holes	147
D.1.5 A more complex encoding object for an integer type	148
D.1.6 Positive integers encoded in BCD	148
D.1.7 An encoding object of class #BITS	149
D.1.8 An encoding object for an octetstring type	150
D.1.9 An encoding object for a character string type	150
D.1.10 Mapping character values to bit values	150
D.1.11 An encoding object for a sequence type	151
D.1.12 An encoding object for a choice type	151
D.1.13 Encoding a bitstring containing another encoding	152
D.1.14 An encoding object set	152
D.1.15 ASN.1 definitions	153
D.1.16 EDM definitions	153
D.1.17 ELM definitions	154
D.2 Specialization examples	154
D.2.1 Encoding by distributing values to an alternative encoding structure	154
D.2.2 Encoding by mapping ordered abstract values to an alternative encoding structure	155
D.2.3 Compression of non-continuous value ranges	155
D.2.4 Compression of non-continuous value ranges using a transform	156
D.2.5 Compression of an unevenly distributed value set by mapping ordered abstract values	156
D.2.6 Presence of an optional component depending on the value of another component	156
D.2.7 The presence of an optional component depends on some external condition	157
D.2.8 A variable length list	157
D.2.9 Equal length lists	158
D.2.10 Uneven choice alternative probabilities	159
D.2.11 A version 1 message	160
D.2.12 The encoding object set	161
D.2.13 ASN.1 definitions	161
D.2.14 EDM definitions	162
D.2.15 ELM definitions	162
D.3 Explicitly generated structure examples	162
D.3.1 Sequence with optional components defined by a pointer	163
D.3.2 Addition of a boolean type as a presence determinant	163
D.3.3 Sequence with optional components identified by a unique tag and delimited by a length field	165

D.3.4	Sequence-of type with a count	166
D.3.5	Encoding object sets.....	166
D.3.6	ASN.1 definitions.....	167
D.3.7	EDM definitions.....	167
D.3.8	ELM definitions	167
D.4	A more-bit encoding example	168
D.4.1	Description of the problem.....	168
D.4.2	Use of ASN.1 to provide the more-bit determinant.....	168
D.4.3	Use of value mappings to provide the more-bit determinant	169
D.4.4	Use of the replacement mechanism to provide the more-bit determinant	170
D.5	Legacy protocol specified with tabular notation	170
D.5.1	Introduction.....	170
D.5.2	Encoding definition for the top-level message structure	172
D.5.3	Encoding definition for a message structure	172
D.5.4	Encoding for the sequence type "B".....	173
D.5.5	Encoding for an octet-aligned sequence-of type with a length determinant.....	173
D.5.6	Encoding for an octet-aligned sequence-of type which continues to the end of the PDU.....	173
D.5.7	EDM definitions.....	173
D.5.8	ELM definitions	174
Annex E	Support for Huffman encodings.....	175
Annex F	Additional information on the Encoding Control Notation (ECN)	177
Annex G	Summary of the ECN notation	178

Introduction

The Encoding Control Notation (ECN) is a notation for specifying encodings of ASN.1 types that differ from those provided by standardized encoding rules. ECN can be used to encode all types of an ASN.1 specification, but can also be used with standardized encoding rules such as BER or PER (Rec. ITU-T X.690 | ISO/IEC 8825-1 and Rec. ITU-T X.691 | ISO/IEC 8825-2) to specify only the encoding of types that have special requirements.

An ASN.1 type specifies a set of abstract values. Encoding rules specify the representation of these abstract values as a series of bits. ECN is designed to meet the following encoding needs:

- a) The need to write ASN.1 types (and get the support of ASN.1 tools in implementations) for established ("legacy") protocols where the encoding is already determined and differs from all standardized encoding rules.
- b) The need to produce encodings that are minor variations on standardized rules.

The linkage provided in an ECN specification to an ASN.1 specification is well-defined and machine processable, so encoders and decoders can be automatically generated from the combined specifications. This is a significant factor in reducing both the amount of work and the possibility of errors in making interoperable systems. Another significant advantage is the ability to provide automatic tool support for testing.

These advantages are available with ASN.1 alone when standardized encoding rules suffice, but the ECN work provides these advantages in circumstances where the standardized encoding rules are not sufficient.

NOTE 1 – Currently ECN support only binary-based encodings, but could be extended in the future to cover character-based encodings.

Annex A forms an integral part of this Recommendation | International Standard, and details modifications to be made to Rec. ITU-T X.680 | ISO/IEC 8824-1 to support the notation used in this Recommendation | International Standard.

Annex B forms an integral part of this Recommendation | International Standard, and details modifications to be made to Rec. ITU-T X.681 | ISO/IEC 8824-2 to support the notation used in this Recommendation | International Standard.

Annex C forms an integral part of this Recommendation | International Standard, and details modifications to be made to Rec. ITU-T X.683 | ISO/IEC 8824-4 to support the notation used in this Recommendation | International Standard.

NOTE 2 – It is not intended that Annexes A, B and C be progressed as amendments to the referenced Recommendations | International Standards. The modifications are solely for the purpose of ECN definition (see clause 5 and 9.28).

Annex D does not form an integral part of this Recommendation | International Standard, and contains examples of the use of ECN.

Annex E does not form an integral part of this Recommendation | International Standard and provides more detail on the support for Huffman encodings in ECN.

Annex F does not form an integral part of this Recommendation | International Standard, and identifies a Web site providing access to further information and links relevant to ECN.

Annex G does not form an integral part of this Recommendation | International Standard, and provides a summary of ECN using the notation of clause 5.

Information technology – ASN.1 encoding rules: Specification of Encoding Control Notation (ECN)

1 Scope

This Recommendation | International Standard defines a notation for specifying encodings of ASN.1 types or of parts of types.

It provides several mechanisms for such specification, including:

- direct specification of the encoding using standardized notation;
- specification of the encoding by reference to standardized encoding rules;
- specification of the encoding of an ASN.1 type by reference to an encoding structure;
- specification of the encoding using non-ECN notation.

It also provides the means to link the specification of encodings to the type definitions to which they are to be applied.

ECN does not currently provide any support for specifications using the OID internationalized resource identifier type or the relative OID internationalized resource identifier type (see Rec. ITU-T X.680 | ISO/IEC 8824-1), and these are not referred to further in this Standard.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and International Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

NOTE – This Recommendation | International Standard is based on ISO/IEC 10646:2003. It cannot be applied using later versions of this standard.

2.1 Identical Recommendations | International Standards

- Recommendation ITU-T X.660 (2011) | ISO/IEC 9834-1:2012, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the international object identifier tree.*
- Recommendation ITU-T X.680 (2015) | ISO/IEC 8824-1:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*
- Recommendation ITU-T X.681 (2015) | ISO/IEC 8824-2:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- Recommendation ITU-T X.682 (2015) | ISO/IEC 8824-3:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- Recommendation ITU-T X.683 (2015) | ISO/IEC 8824-4:2015, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- Recommendation ITU-T X.690 (2015) | ISO/IEC 8825-1:2015, *Information technology – ASN.1 encoding Rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER).*

ISO/IEC 8825-3:2015 (E)

- Recommendation ITU-T X.691 (2015) | ISO/IEC 8825-2:2015, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

NOTE 1 – Notwithstanding the ISO publication date, the above specifications are normally referred to as "ASN.1:2015".

NOTE 2 – The above references shall be interpreted as references to the identified Recommendations | International Standards together with all their published amendments and technical corrigenda.

2.2 Additional references

- ISO/IEC 10646:2003, *Information technology – Universal Multiple-Octet Coded Character Set (UCS)*.

NOTE – The above reference shall be interpreted as a reference to ISO/IEC 10646 together with all its published amendments and technical corrigenda.