

Second edition
2022-10

Information technology — MPEG video technologies —

Part 7: Versatile supplemental enhancement information messages for coded video bitstreams

Technologies de l'information — Technologies vidéo MPEG —

Partie 7: Messages d'améliorations complémentaires polyvalents pour les flux binaires vidéo codés



Reference number
ISO/IEC 23002-7:2022(E)

© ISO/IEC 2022



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of ISO/IEC 23002-7:2022. [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	8
5 Conventions	9
5.1 General.....	9
5.2 Arithmetic operators.....	9
5.3 Logical operators.....	10
5.4 Relational operators.....	10
5.5 Bit-wise operators.....	10
5.6 Assignment operators.....	11
5.7 Range notation.....	11
5.8 Mathematical functions.....	11
5.9 Order of operation precedence.....	12
5.10 Variables, syntax elements and tables.....	13
5.11 Text description of logical operations.....	14
5.12 Processes.....	15
6 Syntax and semantics	16
6.1 General.....	16
6.2 Method of specifying syntax in tabular form.....	17
6.3 Specification of syntax functions and descriptors.....	18
7 Video usability information parameters	19
7.1 General.....	19
7.2 VUI parameters syntax.....	19
7.3 VUI parameters semantics.....	20
8 SEI messages	27
8.1 General.....	27
8.2 Filler payload SEI message.....	28
8.2.1 Filler payload SEI message syntax.....	28
8.2.2 Filler payload SEI message semantics.....	28
8.3 User data registered by Rec. ITU-T T.35 SEI message.....	28
8.3.1 User data registered by Rec. ITU-T T.35 SEI message syntax.....	28
8.3.2 User data registered by Rec. ITU-T T.35 SEI message semantics.....	29
8.4 User data unregistered SEI message.....	29
8.4.1 User data unregistered SEI message syntax.....	29
8.4.2 User data unregistered SEI message semantics.....	29
8.5 Film grain characteristics SEI message.....	29
8.5.1 Film grain characteristics SEI message syntax.....	29
8.5.2 Film grain characteristics SEI message semantics.....	30
8.6 Frame packing arrangement SEI message.....	38
8.6.1 Frame packing arrangement SEI message syntax.....	38
8.6.2 Frame packing arrangement SEI message semantics.....	38
8.7 Parameter sets inclusion indication SEI message.....	47
8.7.1 Parameter sets inclusion indication SEI message syntax.....	47
8.7.2 Parameter sets inclusion indication SEI message semantics.....	47
8.8 Decoded picture hash SEI message.....	48
8.8.1 Decoded picture hash SEI message syntax.....	48
8.8.2 Decoded picture hash SEI message semantics.....	48
8.9 Mastering display colour volume SEI message.....	50

This is a preview of ISO/IEC 23002-7:2022. [Click here to purchase the full version from the ANSI store.](#)

8.9.1	Mastering display colour volume SEI message syntax.....	50
8.9.2	Mastering display colour volume SEI message semantics.....	50
8.10	Content light level information SEI message.....	52
8.10.1	Content light level information SEI message syntax.....	52
8.10.2	Content light level information SEI message semantics.....	52
8.11	Dependent random access point indication SEI message.....	53
8.11.1	Dependent random access point indication SEI message syntax.....	53
8.11.2	Dependent random access point indication SEI message semantics.....	53
8.12	Alternative transfer characteristics information SEI message.....	54
8.12.1	Alternative transfer characteristics information SEI message syntax.....	54
8.12.2	Alternative transfer characteristics SEI message semantics.....	54
8.13	Ambient viewing environment SEI message.....	54
8.13.1	Ambient viewing environment SEI message syntax.....	54
8.13.2	Ambient viewing environment SEI message semantics.....	54
8.14	Content colour volume SEI message.....	55
8.14.1	Content colour volume SEI message syntax.....	55
8.14.2	Content colour volume SEI message semantics.....	56
8.15	Omnidirectional video specific SEI messages.....	58
8.15.1	Sample location remapping process.....	58
8.15.2	Equirectangular projection SEI message.....	69
8.15.3	Generalized cubemap projection SEI message.....	72
8.15.4	Sphere rotation SEI message.....	78
8.15.5	Region-wise packing SEI message.....	79
8.15.6	Omnidirectional viewport SEI message.....	86
8.16	Frame-field information SEI message.....	88
8.16.1	Frame-field information SEI message syntax.....	88
8.16.2	Frame-field information SEI message semantics.....	88
8.17	Sample aspect ratio information SEI message.....	91
8.17.1	Sample aspect ratio information SEI message syntax.....	91
8.17.2	Sample aspect ratio information SEI message semantics.....	91
8.18	Annotated regions SEI message.....	92
8.18.1	Annotated regions SEI message syntax.....	92
8.18.2	Annotated regions SEI message semantics.....	94
8.19	Scalability dimension information SEI message.....	97
8.19.1	Scalability dimension information SEI message syntax.....	97
8.19.2	Scalability dimension information SEI message semantics.....	97
8.20	Multiview acquisition information SEI message.....	99
8.20.1	Multiview acquisition information SEI message syntax.....	99
8.20.2	Multiview acquisition information SEI message semantics.....	100
8.21	Multiview view position SEI message.....	104
8.21.1	Multiview view position SEI message syntax.....	104
8.21.2	Multiview view position SEI message semantics.....	104
8.22	Depth representation information SEI message.....	104
8.22.1	Depth representation information SEI message syntax.....	104
8.22.2	Depth representation information SEI message semantics.....	105
8.23	Alpha channel information SEI message.....	108
8.23.1	Alpha channel information SEI message syntax.....	108
8.23.2	Alpha channel information SEI message semantics.....	109
8.24	Extended DRAP indication SEI message.....	112
8.24.1	Extended DRAP indication SEI message syntax.....	112
8.24.2	Extended DRAP indication SEI message semantics.....	112
8.25	Display orientation SEI message.....	113
8.25.1	Display orientation SEI message syntax.....	113
8.25.2	Display orientation SEI message semantics.....	113
8.26	Colour transform information SEI message.....	114
8.26.1	Colour transform information SEI message syntax.....	114
8.26.2	Colour transform information SEI message semantics.....	115
8.27	Reserved SEI message.....	119

This is a preview of ISO/IEC 23002-7:2022. [Click here to purchase the full version from the ANSI store.](#)

	8.27.1	Reserved SEI message syntax.....	119
	8.27.2	Reserved SEI message semantics.....	119
9		Parsing process for k-th order Exp-Golomb codes.....	119
	9.1	General.....	119
	9.2	Mapping process for signed Exp-Golomb codes.....	121
		Bibliography.....	122

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_or_www.iec.ch/members_experts/refdocs).

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 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. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information information*, in collaboration with ITU-T (as Rec. ITU-T H.274).

This second edition cancels and replaces the first edition (ISO/IEC 23002-7:2021), which has been technically revised.

The main changes are as follows:

- the addition of the annotated regions SEI message,
- the addition of the alpha channel information SEI message,
- the addition of the depth representation information SEI message,
- the addition of the multiview acquisition information SEI message,
- the addition of the multiview view position SEI message,
- the addition of the scalability dimension information SEI message,
- the addition of the extended dependent random access point indication SEI message,
- the addition of the display orientation SEI message, and
- the addition of the colour transform information SEI message.

A list of all parts in the ISO/IEC 23002 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

This is a preview of ISO/IEC 23002-7:2022. [Click here to purchase the full version from the ANSI store.](#)

Introduction

Versions of this document

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 1 refers to the first approved version of this document. The first edition published by ITU-T as Rec. ITU-T H.274 (08/2020) and by ISO/IEC as ISO/IEC 23002-7:2021 corresponded to the first version.

Rec. ITU-T H.274 | ISO/IEC 23002-7 version 2 (the current version) refers to the integrated text containing nine additional SEI messages, namely the annotated regions SEI message, the alpha channel information SEI message, the depth representation information SEI message, the multiview acquisition information SEI message, the multiview view position SEI message, the scalability dimension information SEI message, the extended dependent random access point indication SEI message, the display orientation SEI message, and the colour transform information SEI message. Besides these additional SEI messages, this version also contains corrections to various minor defects in the prior content of the specification. The second edition published by ISO/IEC as ISO/IEC 23002-7:202X corresponds to the second version. At the time of publication of this edition by ISO/IEC, a corresponding second edition of Rec. ITU-T H.274 was in preparation for publication by ITU-T.

Conventions

The term "this document" is used to refer to this Recommendation | International Standard.

In this document, the following verbal forms are used:

- "shall" indicates a requirement. When used to express a mandatory constraint on the values of syntax elements or the values of variables derived from these syntax elements, it is the responsibility of the encoder to ensure that the constraint is fulfilled.
- "should" indicates a recommendation. It is used to refer to behaviour of an implementation that is encouraged to be followed under anticipated ordinary circumstances, but is not a requirement for conformance to this document.
- "may" indicates a permission.
- "can" indicates a possibility or a capability.

Information marked as "NOTE" is intended to assist the understanding or use of the document. "Notes to entry" used in [Clause 3](#) provide additional information that supplements the terminological data and can contain provisions relating to the use of a term.

Patent declarations

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

ISO and IEC take no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured ISO and IEC that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO and IEC. Information may be obtained from the patent database available at www.iso.org/patents or <https://patents.iec.ch>.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those in the patent database. ISO and IEC shall not be held responsible for identifying any or all such patent rights.