 **ISO/IEC JTC 1/SC 29/ WG 11 N 19549**

**ISO/IEC JTC 1/SC 29/WG 11**

**Coding of moving pictures and audio**

**Convenorship: Japan (JISC)**

|  |  |
| --- | --- |
| **Document type:** | Approved WG 11 document |
| **Title:** | WD 2.0 of V-PCC Conformance |
| **Status:** | Approved |
| **Date of document:** | 2020-07-31 |
| **Source:** | Convenor, ISO/IEC JTC 1/SC 29/WG 11 |
| **No. of Pages:** | 6 |
| **Email of acting convenor** | ostermann@tnt.uni-hannover.de |
| **Committee URL:** | <http://isotc.iso.org/livelink/livelink/open/jtc1sc29> |
|  |  |

**ISO/IEC 23090-19:2020(E)**

ISO/IEC JTC 1/SC 29/WG 11

Secretariat: JISC

**Information technology — Coded Representation of Immersive Media — Part 19:** **Reference software for Visual Volumetric Video-based Coding (V3C) and Video-based Point Cloud Compression (V-PCC)**

WD stage

**Warning for WDs and CDs**

This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

© ISO/IEC 2020

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

Fax: +41 22 749 09 47

Email: copyright@iso.org

Website: www.iso.org

Published in Switzerland

**Contents**

[Foreword iv](#_Toc44928879)

[Abstract v](#_Toc44928880)

[Introduction\* v](#_Toc44928881)

[1 Scope 1](#_Toc44928882)

[2 Normative reference 1](#_Toc44928883)

[2.1 General 1](#_Toc44928884)

[2.2 International Standards equivalent in technical content 1](#_Toc44928885)

[2.3 Additional references 1](#_Toc44928886)

[3 Definitions 1](#_Toc44928887)

[3.1 Bitstream 1](#_Toc44928888)

[3.2 Decoder 1](#_Toc44928889)

[3.3 Encoder 2](#_Toc44928890)

[3.4 Reference software decoder 2](#_Toc44928891)

[3.5 Reference software encoder 2](#_Toc44928892)

[4 Abbreviations 2](#_Toc44928893)

[5 Conventions 2](#_Toc44928894)

[6 Reference software for ISO/IEC 23090-5 2](#_Toc44928895)

# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](https://www.iso.org/directives-and-policies.html)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. 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](https://www.iso.org/iso-standards-and-patents.html)).

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](https://www.iso.org/foreword-supplementary-information.html).

This document was prepared by Subcommittee 29, Coding of audio, picture, multimedia and hypermedia information.

A list of all parts in the ISO/IEC 23090 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](https://www.iso.org/members.html).

# Abstract

This is a working draft of the reference software implementing the V-PCC/V3C specification. Source code is provided in the attached zip archive.

# Introduction\*

The following Recommendations and International Standards accompanies reference software for ISO/IEC 23090-5 for Visual Volumetric Video-based Coding (V3C) with Video-based Point Cloud Compression (V-PCC). The reference software includes both encoder and decoder functionality.

Reference software is useful in aiding users of a coding standard to establish and test conformance and interoperability, and to educate users and demonstrate the capabilities of the standard. For these purposes, the accompanying software is provided as an aid for the study and implementation of ISO/IEC 23090-5 for Visual Volumetric Video-based Coding (V3C) with Video-based Point Cloud Compression (V-PCC.

The software has been developed by the ISO/IEC Moving Picture Experts Group (MPEG, Working Group 11 of Subcommittee 29 of ISO/IEC Joint Technical Committee 1).

*\*This introduction does not form an integral part of this Recommendation | International Standard.*

**Information technology — Coded Representation of Immersive Media — Part 19: Reference software for Visual Volumetric Video-based Coding (V3C) with Video-based Point Cloud Compression (V-PCC)**

# Scope

This Recommendation | International Standard provides accompanying reference software for ISO/IEC 23090-5 as an electronic attachment. The software is an integral part of this Recommendation | International Standard.

The use of this reference software is not required for making an implementation of an encoder or decoder in conformance to ISO/IEC 23090-5. Requirements established in ISO/IEC 23090-5 take precedence over the behavior of the reference software.

# Normative reference

## General

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 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 Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

## International Standards equivalent in technical content

ISO/IEC 23090-5: *Information technology — Coded Representation of Immersive Media — Part* 5*: Visual Volumetric Video-based Coding (V3C) and Video-based Point Cloud Compression (V-PCC).*

ISO/IEC 23090-20: *Information technology – Coded Representation of Immersive Media — Part 20: Conformance Testing for Visual Volumetric Video-based Coding (V3C) and Video-based Point Cloud Compression (V-PCC).*

## Additional references

None

# Definitions

For the purposes of this Recommendation, the terms, definitions, abbreviations and symbols specified in ISO/IEC 23090-5 (particularly in clause 3) apply. Definitions 3.1, 3.2, and 3.3 below replace the corresponding definitions in ISO/IEC 23090-5. Definitions 3.4 and 3.5 are additional definitions.

## Bitstream

A sequence of bits that may conform to ISO/IEC 23090-5.

## Decoder

An embodiment of a process that operates on a bitstreamand may conform to the decoding process requirements specified for conformance to ISO/IEC 23090-5. The scope of decoder, as considered herein, does not include a display process, which is outside the scope of this Recommendation | International Standard.

## Encoder

An embodiment of a process, not specified in this Recommendation | International Standard, that produces a bitstream.

## Reference software decoder

The decoding software accompanying this Recommendation | International Standard.

## Reference software encoder

The encoding software accompanying this Recommendation | International Standard.

# Abbreviations

For the purposes of this Recommendation | International Standard, relevant abbreviations are specified in clause 4 of ISO/IEC 23090-5.

# Conventions

For the purposes of this International Standard, relevant conventions are specified in clause 5 of ISO/IEC 23090-5.

# Reference software for ISO/IEC 23090-5

The reference software for ISO/IEC 23090-5 is found in the electronic attachment to this Recommendation | International Standard.

The attached software package contains one part:

– VPCC/V3C software

The reference software manual is attached to this document and can be found in the jointed archive: ./doc./mpeg-pcc-tmc2-sw-manual.pdf. This manual can be used to install and use the reference software.