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Part 12: Image File Format

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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 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 https://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*, SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC 23008-12:2017), which has been technically revised. It also incorporates the Amendments ISO/IEC 23008-12:2017/Amd.1:2020, ISO/IEC 23008-12:2017/DAmd.2:2019 and the Technical Corrigendum ISO/IEC 23008-12:2017/Cor. 1:2020.

The main changes are as follows:

— addition of Annexes L to N;

— support for predictive image coding, bursts, bracketing and region annotations.

A list of all parts in the ISO/IEC 23008 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.

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Introduction

The Image File Format is designed to enable the interchange of images and image sequences, as well as their associated metadata. It forms part of a family of specifications that are box-structured, and is built using tools defined in the ISO base media file format. This document specifies both structural brands that can be used with any codec and brands specific to High Efficiency Video Coding (HEVC). The file format specified in this document is referred to as the High Efficiency Image File Format (HEIF). It is suggested that HEIF be pronounced "heaff" (like heath with an ff ending). When the requirements of the HEVC-specific brands are applied, the file format can be referred to as the HEVC Image File Format.

The International Organization for Standardization (ISO) and 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.

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This document is organized as follows:

— Clause 5 specifies general requirements on files and file readers conforming to the Image File Format.

— Clause 6 specifies the file structures for the storage of a single image and an image collection. Additionally, general requirements that shall be supported in all files using the Image File Format for the storage of a single image or an image collection are specified.

— Clause 7 specifies the file structures for the storage of image sequences. Additionally, general requirements that shall be supported in all files using the Image File Format for the storage of image sequences are specified.

— Clause 8 specifies the metadata structures for a single image, an image collection, and image sequences.

— Clause 9 specifies enhancements to the ISO base media file format.

— Clause 10 specifies structural brands for a single image and an image collection, as well as image sequences. Requirements on both files and file readers are specified.

— Annex A specifies the format for storing Exif, XMP, and MPEG-7 metadata in files conforming to the Image File Format.

— Annex B specifies the format for encapsulating HEVC-coded images, image collections, and image sequences according to the Image File Format. Annex B also specifies HEVC-specific brands for a single image and an image collection as well as image sequences. Requirements on both files and file readers are specified.

— Annex C and Annex D specify the MIME type registration for a single image or an image collection, and image sequences, respectively, for the structural and HEVC-specific brands.

— Annex E specifies the format for encapsulating AVC-coded images, image collections, and image sequences according to the Image File Format.

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— Annex F and Annex G specify the MIME type registration for a single image or an image collection, and image sequences, respectively, for the AVC-specific brands.

— Annex H specifies the format for encapsulating JPEG-coded images, image collections, and image sequences according to the Image File Format.

— Annex I outlines guidelines on defining new image formats and brands.

— Annex J contains informative examples of single image and image collection file structures conforming to the Image File Format.

— Annex K provides guidelines for a player operation for progressive refinement and file structures enabling progressive refinement.

— Annex L specifies the format for encapsulating VVC-coded images, image collections, and image sequences according to the Image File Format. Annex L also specifies VVC-specific brands for a single image and an image collection as well as image sequences. Requirements on both files and file readers are specified.

— Annex M specifies the format for encapsulating EVC-coded images, image collections, and image sequences according to the Image File Format. Annex M also specifies EVC-specific brands for a single image and an image collection as well as image sequences. Requirements on both files and file readers are specified.

— Annex N contains considerations on privacy and security relating to the use of the Image File Format.

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Information technology — MPEG systems technologies —

Part 12: Image File Format

1 Scope

This document specifies the Image File Format, an interoperable storage format for a single image, a collection of images, and sequences of images.

The format defined in this document is built on tools defined in ISO/IEC 14496-12 and enables the interchange, editing, and display of images, as well as the carriage of metadata associated with those images. The Image File Format defines structures used to contain metadata, how to link that metadata to the images, and defines how metadata of certain forms is carried.

This document also specifies brands for the storage of images and image sequences conforming to High Efficiency Video Coding (HEVC), Advanced Video Coding (AVC), JPEG, Versatile Video Coding (VVC) and Essential Video Coding (EVC).

NOTE The storage of HEVC, AVC, VVC and EVC video sequences is out of scope and is provided in ISO/IEC 14496-15.

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

ISO/IEC 14496-10, *Information technology — Coding of audio-visual objects — Part 10: Advanced Video Coding*

ISO/IEC 14496-12, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 14496-15, *Information technology — Coding of moving pictures and audio – Part 15: Carriage of network abstraction layer (NAL) unit structured video in the ISO base media file format*

ISO/IEC 23008-2, *Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 2: High efficiency video coding*

ISO/IEC 23090-3, *Information technology — Coded representation of immersive media — Part 3: Versatile video coding*

ISO/IEC 23094-1, *Information technology — General video coding — Part 1: Essential video coding*

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