INTERNATIONAL STANDARD

**ISO/IEC 15444-10**

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# Information technology — JPEG 2000 image coding system: Extensions for three-dimensional data

*Technologies de l'information — Système de codage d'images JPEG 2000: Extensions pour données tridimensionnelles*

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**CONTENTS**

# 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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 15444-10 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. T.809.

ISO/IEC 15444 consists of the following parts, under the general title *Information technology — JPEG 2000 image coding system*:

— *Part 1: Core coding system*

— *Part 2: Extensions*

— *Part 3: Motion JPEG 2000*

— *Part 4: Conformance testing*

— *Part 5: Reference software*

— *Part 6: Compound image file format*

— *Part 8: Secure JPEG 2000*

— *Part 9: Interactivity tools, APIs and protocols*

— *Part 10: Extensions for three-dimensional data*

— *Part 11: Wireless*

— *Part 12: ISO base media file format*

— *Part 13: An entry level JPEG 2000 encoder*



 

**INTERNATIONAL STANDARD**
**ITU-T RECOMMENDATION**

# Information technology – JPEG 2000 image coding system: Extensions for three-dimensional data

## 1 Scope

ITU-T Rec. T.809 | ISO/IEC 15444-10 is a work item subdivision of ISO/IEC 15444 that provides extensions of ITU-T Rec. T.800 | ISO/IEC 15444-1 and ITU-T Rec. T.801 | ISO/IEC 15444-2 for logically cuboidal data sets. In particular, it respects all existing capabilities and syntax of ITU-T Rec. T.800 | ISO/IEC 15444-1 and part of the existing capabilities of ITU-T Rec. T.801 | ISO/IEC 15444-2 for multi-component images, while providing alternatives and extensions to some of those capabilities. Within these constraints, it provides an isotropic specification for three-dimensional data sets, i.e., the project provides identical processing capabilities in all three dimensions even though ITU-T Rec. T.800 | ISO/IEC 15444-1 and ITU-T Rec. T.801 | ISO/IEC 15444-2 codestream syntax differentiates between the two spatial axes and the cross-component axis. The context models currently used in this Recommendation | International Standard are as in ITU-T Rec. T.800 | ISO/IEC 15444-1 and ITU-T Rec. T.801 | ISO/IEC 15444-2. Improved context models will be introduced through an amendment.



## 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 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.

- ITU-T Recommendation T.800 (2002) | ISO/IEC 15444-1:2004, *Information technology – JPEG 2000 image coding system: Core coding system.*
- ITU-T Recommendation T.801 (2002) | ISO/IEC 15444-2:2004, *Information technology – JPEG 2000 image coding system: Extensions.*

## 3 Terms and definitions

For the purposes of this Recommendation | International Standard, the following definitions apply:

**3.1 3D bit-block**: A three-dimensional array of bits. In this Recommendation | International Standard, a 3D bit-block refers to all the bits of the same magnitude in all coefficients or samples. This could refer to a 3D bit-block in a component, tile-component, 3D code-block, region of interest, or other.

**3.2 3D code-block**: A rectangular three-dimensional grouping of coefficients from the same sub-band of a tile-component.

**3.3 3D code-block scan**: The order in which the coefficients within a 3D code-block are visited during a coding pass. The 3D code-block is processed in stripes, each consisting of four rows (or all remaining rows if less than four) and spanning the width of the 3D code-block. Each stripe is processed column by column from top to bottom and from left to right. The complete 3D code-block is consequently scanned slice by slice. Within a slice, ITU-T Rec. T.800 | ISO/IEC 15444-1 is followed.

**3.4 component (update of ITU-T Rec. T.801 | ISO/IEC 15444-2)**: Compressed data from the codestream representing a single set of two- or three-dimensional data.

**3.5 conforming reader (update of ITU-T Rec. T.800 | ISO/IEC 15444-1)**: An application that reads and interprets a JP3D file correctly.

**3.6 decomposition level (update of ITU-T Rec. T.801 | ISO/IEC 15444-2)**: A collection of sub-bands where each coefficient has the same spatial impact or span with respect to the original samples. These include the [H|L|X][H|L|X][H|L|X] sub-band (e.g., LLL, LXL, XXH, …, exclusive XXX) split out of the three-dimensional decomposition sublevels.