
**Electronic still picture imaging —
Removable memory —**

**Part 3:
XMP for digital photography**

Image électronique de photographie — Mémoire amovible —

Partie 3: Utilisation du XMP
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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).

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 42, *Photography*.

ISO 12234 consists of the following parts, under the general title *Electronic still-picture imaging — Removable memory*: <https://standards.iteh.ai/catalog/standards/sist/cede603b-8832-472a-8bff-1bca6d142fd/iso-12234-3-2016>

- *Part 1: Basic removable-memory model*
- *Part 2: TIFF/EP image data format*
- *Part 3: XMP for digital photography*

Introduction

Metadata enables digital images to be more easily searched and located (e.g. by knowing more about the image), more appropriately processed and printed (e.g. by knowing the picture-taking conditions), and more appropriately stored and shared (e.g. by knowing the GPS location of the image and the copyright owner).

Several different TIFF-based metadata formats are commonly used in digital cameras, while XML-encoded metadata is commonly used in on-line image databases.

The purposes of this part of ISO 12234 are, first, to define unambiguously a mapping for metadata properties that are most relevant to digital photography into XMP and, second, to document the meaning of each metadata item.

This part of ISO 12234 is independent of the format of the image file, could be used inside any image file, and could be used in databases of image-related metadata.

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Electronic still picture imaging — Removable memory —

Part 3: XMP for digital photography

1 Scope

This part of ISO 12234 defines an XMP namespace for the metadata used in digital photography applications that is formatted for exchange using the syntax of the XML and provides standard definitions of this metadata.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO 12232, *Photography — Digital still cameras — Determination of exposure index, ISO speed ratings, standard output sensitivity, and recommended exposure index*

ISO 12234-2, *Electronic still-picture imaging — Removable memory — Part 2: TIFF/EP image data format*

ISO 14524, *Photography — Electronic still-picture cameras — Methods for measuring opto-electronic conversion functions (OECFs)*

ISO 16684-1:2012, *Graphic technology — Extensible metadata platform (XMP) specification — Part 1: Data model, serialization and core properties*

ISO/IEC 15444-1, *Information Technology — JPEG 2000 image coding system: Core coding system*

ISO/IEC 15444-2, *Information Technology — JPEG 2000 image coding system — Extensions*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

Exif

image file format which specifies the formats to be used for images, sound, and tags in digital still cameras standardized by CIPA (Camera and Imaging Products Association) and JEITA (Japan Electronics and Information Technology Industries Association)

Note 1 to entry: Exif is abbreviation of “Exchangeable image file format for digital still cameras”.

3.2

namespace

set of unique names that are used to unambiguously label the elements in related data sets

3.3 property

named container for a metadata value at the top level of an XMP packet

[SOURCE: ISO 16684-1:2012, 3.5]

**3.4 Uniform Resource Identifier
URI**

compact sequence of characters that identifies an abstract or physical resource

[SOURCE: ISO 16684-1:2012, 3.8 modified.]

4 Reference model and usage

4.1 General considerations

Figure 1 summarizes the reference model for this part of ISO 12234.

This part of ISO 12234 defines metadata for digital photography and identifies the XMP namespaces used to encode this metadata.

The metadata shall be encoded using the XMP data model and serialization defined in ISO 16684-1.

The metadata includes a number of items that are defined in ISO 16684-1, in Reference [11] or in Reference [6] as indicated in the descriptions of the metadata items included in Clause 6.

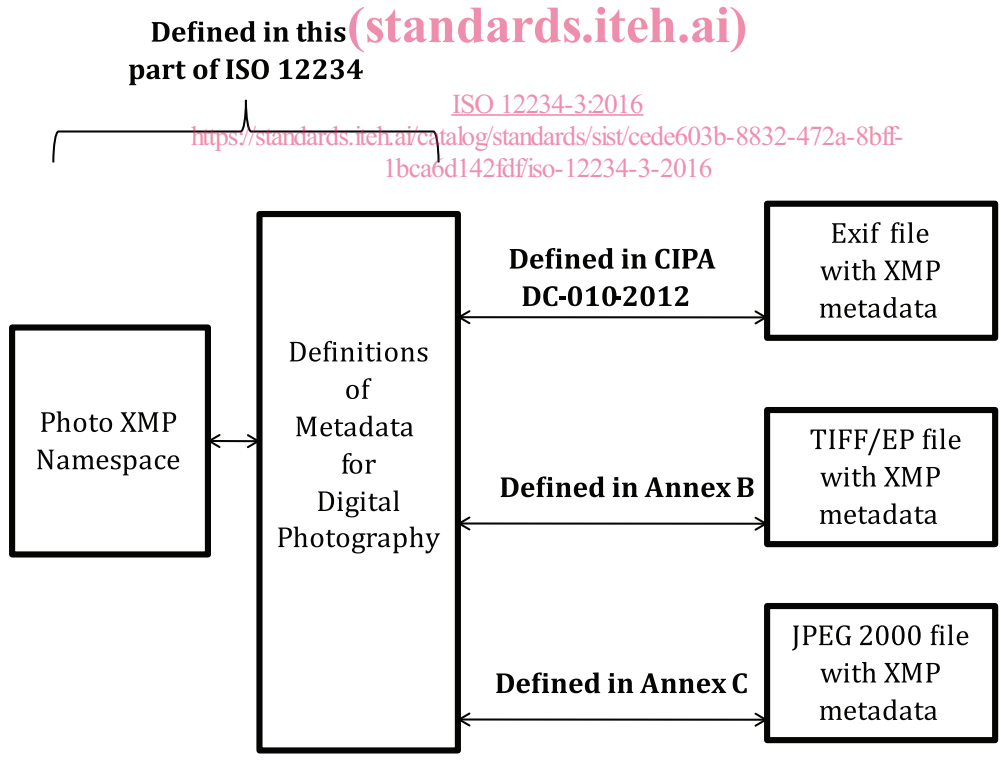


Figure 1 — Reference model

4.2 Native metadata properties and their usage

For Exif, TIFF, and JPEG 2000 file formats supported technical metadata items, only TIFF tags, Exif tags and/or JPEG 2000 boxes should be stored respectively when any one of these file formats is used

with the Photo XMP packet. These are Photo XMP properties in the dc:, tiff:, exif:, exifEX: and xmp: namespaces which are defined in [Clause 5](#).

Refer to sections 4.2.2.1 and 4.2.3.1 of Reference [11] for details.

5 XMP namespace

5.1 General

The XMP namespaces are described in this Clause. Since definitions from current XMP namespaces are used when these definitions are appropriate, metadata properties in this part of ISO 12234 are subset of the properties in these namespaces. Users shall note interpretation from Photo XMP namespaces to these XMP namespaces is not always possible. A new namespace is used only when this is required in order to address newly defined metadata items.

The namespaces in [Table 1](#) shall be used, and the preferred namespace prefixes should be used.

Table 1 — Namespaces used in Photo XMP metadata

Name	URI	Recommended prefix
Dublin Core	http://purl.org/dc/elements/1.1/	dc
Exif 2.21 and Exif 2.3	http://cipa.jp/exif/1.0/	exifEX
Exif 2.2 or earlier	http://ns.adobe.com/exif/1.0/	exif
TIFF Rev. 6.0	http://ns.adobe.com/tiff/1.0/	tiff
XMP	http://ns.adobe.com/xap/1.0/	xmp
PhotoXMP	http://imaging.org/pxmp/1.0/	pxmp

NOTE For convenience in this part of ISO 12234, XMP names are commonly written in a **prefix:local** style; for example, **dc:title**. The relevant URI for the prefix used in this part of ISO 12234 is either explicit or clear from local context. Each URI in [Table 1](#) is the XML namespace, not a URL pointing to a document available on the Internet.

5.2 Extensions

Properties and definitions for new metadata may be added to existing component and XMP namespaces if they do not cause problems for existing processors and applications of the metadata.

The names and definitions of properties in existing namespaces shall remain unchanged.

If it is necessary to change the definition of a property, a new property shall be created, and the old one may be deprecated.

A new version of a namespace and definitions with a new URI may be created so that there is no logical connection between the two versions and the same local name in two different namespaces refers to distinct properties and definitions.

6 Metadata definitions

6.1 Metadata lists

Photo XMP metadata items are defined in this Clause. A list of these items, along with a brief description and the XMP name, is given in [Table 2](#).

Table 2 — Photo XMP metadata list

Metadata name	Description	XMP name	Type
ApertureValue	Aperture value	exif:ApertureValue	Rational
Artist	Person who captured the image	dc:creator	Ordered array of ProperName
BodySerialNumber	Serial number of the digital camera used to capture the image	exifEX:BodySerialNumber	Text
CameraOwnerName	Owner of the camera used to capture the image	exifEX:CameraOwnerName	ProperName
CaptureSet	Image position within a set of captured images	pxmp:CaptureSet	Structure
CFAPattern	Colour filter array geometric pattern of the image sensor	exif:CFAPattern	CFA-Pattern
ColourEncoding	Colour encoding information	pxmp:ColourEncoding	Closed choice of Integer
Copyright	Image copyright holder and optional copyright statement	dc:rights	LanguageAlternative
DateTimeDigitized	Date and time when the image was stored as digital data	xmp:CreateDate	Date
DateTimeOriginal	Date and time when the image was captured	exif:DateTimeOriginal	Date
DateTime	Date and time that the image was last modified	xmp:ModifyDate	Date
DigitalZoomRatio	Digital zoom ratio used to capture the image	exif:DigitalZoomRatio	Rational
Editor	Person(s) who edited the image file	pxmp:Editor	Ordered array of ProperName
ExposureBiasValue	Exposure bias in exposure value	exif:ExposureBiasValue	Rational
ExposureIndex	Exposure index used by the camera to capture the image	exif:ExposureIndex	Rational
ExposureProgram	Class of camera exposure program used to capture the image	exif:ExposureProgram	Closed choice of Integer
Faces	Locations of faces in the image, optionally includes the names of the faces	pxmp:Faces	Structure
Favorites	Identifier of a "favourite" image	pxmp:Favorites	Closed choice of Integer
Flash	State of camera illumination source used to capture the image	exif:Flash	Structure
FocalLength	Actual focal length of the lens used to capture the image	exif:FocalLength	Rational
FocalLengthIn35mm Film	Indicates the equivalent focal length assuming a 35 mm film camera	exif:FocalLengthIn35mmFilm	Integer

Table 2 (continued)

Metadata name	Description	XMP name	Type
GPS	Location of the camera used to capture the image	exif:GPS	Structure
ImageAspectRatio	Ratio of image width to image height	pxmp:ImageAspect	Rational
ImageDescription	Title of the image	dc:description	LanguageAlternative
ImageLength	Number of rows of pixels in the image	tiff:ImageLength	Integer
ImageTileSet	Image position of a series of captured images of 1-D or 2-D panoramic series	pxmp:ImageTileSet	ImageTile
ImageWidth	Number of columns of pixels in the image	tiff:ImageWidth	Integer
LensMake	Lens manufacturer	exifEX:LensMake	ProperName
LensModel	Lens's model name and model number	exifEX:LensModel	Text
LensSerialNumber	Serial number of the interchangeable lens used to capture the image	exifEX:LensSerialNumber	Text
LensSpecification	Minimum focal length, maximum focal length, minimum f/number in the minimum focal length, and minimum f/number in the maximum focal length, which are specification information for the lens	exifEX:LensSpecification	Ordered array of Rational
LightSource	Light source which illuminated the scene that is depicted in the image file	exif:LightSource	Closed choice of Integer
Make	Manufacturer of the digital camera used to capture the image	tiff:Make	ProperName
MaxApertureValue	Smallest f/number of lens in aperture value	exif:MaxApertureValue	Rational
MeteringMode	Mode used for exposure metering used to capture the image	exif:MeteringMode	Closed choice of Integer
Model	Model name of the digital camera used to capture the image	tiff:Model	ProperName
MultiSpectralCaptureSet	The spectral capture conditions of a multispectral image set	pxmp:MultiSpectralCaptureSet	MultiSpectral
OECF	Opto-Electronic Conversion Function as specified in ISO 14524	exif:OECF	OECF/ SFR
Orientation	Orientation of the captured image	tiff:Orientation	Closed choice of Integer
SceneLuminance	Measured average luminance of the scene	pxmp:SceneLuma	Rational

Table 2 (continued)

Metadata name	Description	XMP name	Type
Self-TimerMode	Self-timer delay	pxmp:Timer	Integer
ShutterSpeedValue	Time value	exif:ShutterSpeedValue	Rational
Software	Name of the first known tool used to create the resource (the writer software/firmware)	xmp:CreatorTool	AgentName
SubjectArea	Coordinates of the area of the main subject in the image	exif:SubjectArea	Ordered array of Integer
SubjectDistance	Distance between the camera and the subject in the scene on which the camera is focused	exif:SubjectDistance	Rational
UserComments	Comments concerning the image	exif:UserComment	LanguageAlternative

Table 3 groups the metadata items listed in Table 2 based on their attribution (such as xmp, tiff, dc, exif) rather than in alphabetical order.

Table 3 — Category list

Category	Metadata name	XMP name
TIFF/image data structure	ImageWidth	tiff:ImageWidth
TIFF/image data structure	ImageLength	tiff:ImageLength
TIFF/other	DateTime	xmp:ModifyDate
TIFF/other	ImageDescription	dc:description
TIFF/other	Make	tiff:Make
TIFF/other	Model	tiff:Model
TIFF/other	Orientation	tiff:Orientation
TIFF/other	Software	xmp:CreatorTool
TIFF/other	Artist	dc:creator
TIFF/other	Copyright	dc:rights
Exif/user information	UserComments	exif:UserComment
Exif/date and time	DateTimeOriginal	exif:DateTimeOriginal
Exif/date and time	DateTimeDigitized	xmp:CreateDate
Exif/picture-taking conditions	ExposureProgram	exif:ExposureProgram
Exif/picture-taking conditions	OECF	exif:OECF
Exif/picture-taking conditions	ShutterSpeedValue	exif:ShutterSpeedValue
Exif/picture-taking conditions	ApertureValue	exif:ApertureValue
Exif/picture-taking conditions	ExposureBiasValue	exif:ExposureBiasValue
Exif/picture-taking conditions	MaxApertureValue	exif:MaxApertureValue
Exif/picture-taking conditions	SubjectDistance	exif:SubjectDistance
Exif/picture-taking conditions	MeteringMode	exif:MeteringMode
Exif/picture-taking conditions	LightSource	exif:LightSource
Exif/picture-taking conditions	Flash	exif:Flash
Exif/picture-taking conditions	FocalLength	exif:FocalLength
Exif/picture-taking conditions	FocalLengthIn35mmFilm	exif:FocalLengthIn35mmFilm
Exif/picture-taking conditions	SubjectArea	exif:SubjectArea