PD ISO/TS 22028-4:2012

BSI Standards Publication

Photography and graphic technology — Extended colour encodings for digital image storage, manipulation and interchange

Part 4: European Colour Initiative RGB colour image encoding [eciRGB (2008)]

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National foreword

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Photographie et technologie graphique — Codages par couleurs étendues pour stockage, manipulation et échange d'image numérique —

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Foreword

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

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

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 22028-4 was prepared by Technical Committee ISO/TC 42, *Photography*.

ISO/TS 22028 consists of the following parts, under the general title *Photography and graphic technology — Extended colour encodings for digital image storage, manipulation and interchange*:

— *Part 1: Architecture and requirements*

— *Part 2: Reference output medium metric RGB colour image encoding (ROMM RGB)*

— *Part 3: Reference input medium metric RGB colour image encoding (RIMM RGB)* [Technical Specification]

— *Part 4: European Colour Initiative RGB colour image encoding [eciRGB (2008)]* [Technical Specification]

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Introduction

This Technical Specification has been developed in order to meet the industry need for a complete, fully documented, publicly available definition of an output-referred extended gamut RGB colour image encoding which is optimized for an 8-bit encoding and the conversion of RGB images into offset print colour spaces. Since users have also asked for a 16-bit encoding it has been added to this Technical Specification as well. This colour image encoding provides a way to represent output-referred images that does not limit the colour gamut to those colours capable of being displayed on a CRT monitor, such as that represented by the sRGB colour encoding, or require the use of negative RGB colorimetry coordinates, such as with extended sRGB colour encodings like bg-sRGB.

An extended colour-gamut colour encoding is particularly desirable for professional photography applications. For example, colours used for company logos may be outside a monitor gamut and would therefore need to be clipped or compressed to a less saturated colour. Similarly, scanned photographic prints that are to be duplicated may contain colours outside a monitor RGB colour-gamut. By using a standard output-referred extended gamut colour image encoding, images containing such colours can be stored, interchanged, manipulated, and later printed, without limiting or distorting the colours of the final output.

The European Colour Initiative (ECI) RGB colour image encoding [eciRGB (2008)] specified in this international standard meets the needs of these types of applications.

The primaries of eciRGB (2008) are between Reference Output Medium Metric RGB (ROMM RGB) and sRGB, thereby providing a larger gamut than sRGB, together with lower quantization errors than ROMM RGB. The tone curve has an encoding linear to the L* axis defined in the CIE 1976 (L*, a*, b*) colour space (CIELAB 1976).

This Technical Specification has been prepared to provide sufficient documentation, consistent with the definitions of ISO 22028-1, to allow the imaging community adequate opportunity for implementation and evaluation of this colour image encoding. It is anticipated that, when there is sufficient implementation of, and practical experience in the use of, eciRGB (2008), this Technical Specification can be revised as an International Standard.

The European Colour Initiative owns the copyright on the name eciRGB (2008) and has granted ISO the irrevocable non-exclusive right to use the name for the purpose of this Technical Specification. A colour encoding named eciRGB was initiated by ECI in 2004. A second version of this encoding with a modified tonal curve was defined in 2008. Because of its importance to the European photographers and graphic arts industry, this Technical Specification was prepared in order to fully define eciRGB according to ISO 22028-1.

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Photography and graphic technology — Extended colour encodings for digital image storage, manipulation and interchange —

Part 4: European Colour Initiative RGB colour image encoding [eciRGB (2008)]

1 Scope

This Technical Specification defines an extended colour-gamut output-referred RGB colour image encoding designated as European Colour Initiative RGB [eciRGB (2008)]. Digital images encoded using eciRGB (2008) can be manipulated, stored, transmitted, displayed, or printed by digital still picture imaging systems. Two precision levels are defined, using 8 bits/channel and 16 bits/channel.

2 Normative references

The following referenced documents are indispensable for the application 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 3664:2009, *Graphic technology and photography — Viewing conditions*

ISO 11664-1, *Colorimetry — Part 1: CIE standard colorimetric observers*

ISO 22028-1, *Photography and graphic technology — Extended colour encodings for digital image storage, manipulation and interchange — Part 1: Architecture and requirements*

CIE Publication 15, *Colorimetry*

3 Terms and definitions

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

3.1
adapted white
colour stimulus that an observer who is adapted to the viewing environment would judge to be perfectly achromatic and to have a luminance factor of unity, i.e. absolute colorimetric coordinates that an observer would consider to be a perfect white diffuser

NOTE The adapted white can vary within a scene.

3.2
additive RGB colour space
a colorimetric colour space having three colour primaries (generally red, green and blue) such that CIE XYZ tristimulus values can be determined from the RGB colour space values by forming a weighted combination of the CIE XYZ tristimulus values for the individual colour primaries, where the weights are proportional to the radiometrically linear colour space values for the corresponding colour primaries

NOTE 1 A simple linear 3 × 3 matrix transformation can be used to transform between CIE XYZ tristimulus values and the radiometrically linear colour space values for an additive RGB colour space.

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