AS ISO 15739:2022
ISO 15739:2017

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# Photography — Electronic still-picture imaging — Noise measurements

AS ISO 15739:2022

This Australian Standard ® was prepared by MS-065, Photography. It was approved on behalf of the Council of Standards Australia on 13 May 2022.

This Standard was published on 3 June 2022.

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Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute of Professional Photography
Australian War Memorial
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This Standard was issued in draft form for comment as DR AS ISO 15739:2022.

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ISBN 978 1 76113 802 7

AS ISO 15739:2022
ISO 15739:2017

# Photography — Electronic still-picture imaging — Noise measurements

Originated as AS ISO 15739:2015.
Second edition 2022.

# Preface

This Standard was prepared by the Standards Australia Committee MS-065, Photography, to supersede AS ISO 15739:2015.

The objective of this document is to specify methods for measuring and reporting the noise versus signal level and dynamic range of digital still cameras. It applies to both monochrome and colour electronic digital still cameras.

This document is identical with, and has been reproduced from, ISO 15739:2017, *Photography — Electronic still-picture imaging — Noise measurements*.

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# Contents

# 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).

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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.

This document was prepared by Technical Committee ISO/TC 42, *Photography*.

This third edition cancels and replaces the second edition (ISO 15739:2013), of which it constitutes a minor revision with the addition of IEC 61966-2–1:1999 to Clause 2 and changes in Annex B.

# Introduction

Noise is an important attribute of electronic photographic systems. Camera noise measurements described in this document are performed in the digital domain, using digital analysis techniques. Since the noise performance of an image sensor may vary significantly with exposure time and operating temperature, these operating conditions are specified. The visibility of noise to human observers depends on the magnitude of the noise, the apparent tone of the area containing the noise and the spatial frequency of the noise. The magnitude of the noise present in an output representation depends on the noise present in the stored image data and the contrast amplification or gain applied to the data in producing the output. The noise visibility is different for the luminance (or monochrome) channel and the colour (or colour difference) channels. Therefore, this document accounts for these factors in measuring and reporting the camera noise measurements. Annex A specifies the method for determining the components of the digital camera noise from a number of samples. The perceptibility of noise in an image can vary depending on the viewing distance, spatial frequency, density, colour and viewing conditions. Annex B describes a procedure for measuring the visual noise level using a human visual model as a method for weighting the spectral components of the noise. A method for removing low frequency variations in the patch data resulting, for example, from luminance shading is given in Annex C. A recommended step-by-step procedure for determining the signal-to-noise ratio and incremental gain is provided in Annex D. In Annex E, recommendations for practical viewing conditions for various output media are given.

NOTES

# Australian Standard®

# Photography — Electronic still-picture imaging — Noise measurements

## 1 Scope

This document specifies methods for measuring and reporting the noise versus signal level and dynamic range of digital still cameras. It applies to both monochrome and colour electronic digital still cameras.

## 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 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 7589:2002, *Photography — Illuminants for sensitometry — Specifications for daylight, incandescent tungsten and printer*

ISO 12232:2006, *Photography — Digital still cameras — Determination of exposure index, ISO speed ratings, standard output sensitivity, and recommended exposure index*

ISO 14524:2009, *Photography — Electronic still-picture cameras — Methods for measuring opto-electronic conversion functions (OECFs)*

ITU-R BT.709-5, *Parameter values for the HDTV Standards for production and International programme exchange*

IEC 61966-2–1:1999, *Multimedia systems and equipment — Colour measurement and management – Part 2-1: Colour management — Default RGB colour space — sRGB*

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

**3.1**
**camera opto-electronic conversion function**
**camera OECF**
relationship between the input scene log luminances and the pixel values for an opto-electronic digital capture system

Note 1 to entry: The unit of measurement for this function are $\log_{10}$ cd/m2.

**3.2**
**clipping value**
pixel value that remains constant for further increases in exposure (highlight clipping value) or for further decreases in exposure (dark clipping value)

**3.3**
**digital still camera**
**DSC**
camera that produces a digital still image from the digitized output of a solid-state photo sensor and records the digital still image using a digital memory, such as a removable memory card