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## Photography — Electronic still-picture imaging — Noise measurements

*Photographie — Imagerie des prises de vue électroniques —  
Mesurages du bruit*



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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. [www.iso.org/directives](http://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.

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

This second edition cancels and replaces the first edition (ISO 15739:2003), which has been technically revised.

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## Introduction

Noise is an important attribute of electronic photographic systems. The camera noise measurements described in this International Standard 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 International Standard 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.