BS ISO 17957:2015

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Photography — Digital cameras — Shading measurements

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A list of organizations represented on this committee can be obtained on request to its secretary.

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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).

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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 WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

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

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Introduction

One common type of image phenomenon seen in digital cameras is a systematic intensity variation across an image known as luminance shading. There are several causes of luminance shading in a digital camera: pixels having non-uniform sensitivity across a sensor array, illumination non-uniformity, lens shading, pixel geometry, and electronic non-uniformity. Characteristics of lens shading include symmetry about the optical sensor, uniformity across each colour plane, and variation as a function of $\cos^n\Theta$. Luminance shading only affects intensity falloff.

Colour variations within the image can be induced by several factors, all of which will cause varying degrees of non-neutrality within an ideal uniform-gray exposure. Some of the primary factors include, (a) a mismatch between the CMOS micro-lens optical acceptance angle and the lens' chief ray angle over the field of view, (b) spatially varying spectral transmittance differences from the infrared rejection filter (usually most significant at the cutoff wavelength), and (c) inherent spectral sensitivity differences across the array. Consistent, systematic variations can be reduced through correction via image processing, but there might remain residual colour variations.

The information that follows defines the recommended approach for creating a test scene to use for the evaluation of luminance shading and colour variations, as well as specifying the conditions for illumination and exposure. The currently proposed analysis approach to quantify the magnitude of colour variations is described. It is important to understand that this specification is related to the degree of colour variations that are apparent in the image, not the specific colour accuracy. Thus, an image that appeared pink but was uniformly pink over the entire image would be equivalent to a perfectly uniform gray field relative to this colour non-uniformity specification.

Some part of this International Standard is based on the work done by the Camera Phone Image Quality group (CPIQ) within the International Imaging Industry Association (I3A), now part of the Institute of Electrical and Electronics Engineers (IEEE), whose contribution is greatly acknowledged.

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