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Photography — Digital still cameras — Measuring shooting time lag, shutter release time lag, shooting rate, and start-up time lag

Photographie — Caméras numériques — Décalage dans le temps du mesurage de la prise, décalage dans le temps de l'ouverture de l'objectif, cadence de prise et temps de démarrage

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Test conditions ... **3**
4.1 Illumination of the test scene ... 3
4.2 The chart and positioning of the digital still camera ... 4
4.3 Battery status ... 5
4.4 Memory card ... 5
4.5 Flash ... 5
4.6 Image stabilization ... 5
4.7 Other camera settings ... 5
5 Measurements ... **6**
5.1 Definition of measurement ... 6
5.1.1 General ... 6
5.1.2 Measurement with external controls ... 7
5.1.3 Measurement with internal controls ... 7
5.2 Measurement method ... 8
5.2.1 Start-up time ... 8
5.2.2 Shooting time lag ... 9
5.2.3 Shutter release time lag ... 10
5.2.4 Shooting rate ... 10
6 Reporting the results ... **11**
Annex A (informative) **Test results of methods to start the timing device** ... **13**
Annex B (informative) **Timing device** ... **15**
Annex C (informative) **Measurement with internal controls** ... **21**
Annex D (informative) **Examples of reporting the result** ... **28**
Annex E (informative) **Estimation of the measurement accuracy** ... **30**
Annex F (informative) **Example setup for measuring the shooting time lag for cameras with continuous autofocus** ... **32**
Bibliography ... **36**

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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 of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 15781:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Current scope includes digital still cameras that continuously shoot images into the buffer and select an image depending on the moment the exposure button is pressed.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Taking pictures of a moving target was nearly impossible in the early days of digital photography. After pressing the exposure button it took a significant amount of time to capture the image and the chance to preserve the desired moment was gone.

Part of the time between pressing the exposure button and the exposed picture is needed to focus, another part is needed to adjust the exposure, etc. This unwelcome but unavoidable period of time is called shooting time lag. This is often mixed with the term shutter release time lag, which is also defined in this document. Optimized systems are nowadays able to decrease these time lags.

Capturing the different stages of a fast moving object is sometimes very important especially in areas like sports or people photography. This high shooting rate requires fast image processing within the digital still camera that can be measured according to the method described in this document.

When a photographer decides to capture an image of a changing scene, if his or her digital still camera takes a long time to be ready to shoot once it is turned on, the opportunity to capture the image is lost. This time named start-up time lag is therefore another important value, which can be determined using this document.

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Photography — Digital still cameras — Measuring shooting time lag, shutter release time lag, shooting rate, and start-up time lag

1 Scope

This document specifies how to measure and report the shooting time lag, shutter release time lag, shooting rate and start-up time lag for digital still cameras, including camera modules in phones and tablet computers. It includes a method that uses control signals inside the digital still camera and a method that determines the timing values without requiring access to the inside of the digital still camera.

This document does not address the measurement either of auto focus speed below recommended illumination level or auto focus accuracy.

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

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:

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

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

3.1
digital still camera
device which incorporates an image sensor and produces a digital signal representing a still picture (1)

Note 1 to entry: A digital still camera is typically a portable, hand-held device. The digital signal is usually recorded on a removable memory, such as a solid-state memory card or magnetic disk.

[SOURCE: ISO 12231, 3.40, modified — Note 2 to entry has been deleted.]

3.2
shooting time lag
t_{SL}
time elapsed from stand-by state to reaching capture point on a digital still camera or a module built into a mobile device and the beginning of the exposure

Note 1 to entry: This period of time includes all measurements and adjustments (e.g. auto focus and exposure control) a digital still camera needs to make prior to the beginning of the exposure.

Note 2 to entry: When the exposure button of a digital still camera is pressed it performs a number of time-consuming measurements and adjustments, e.g. determination of the exposure and focus adjustment. The time needed for these procedures is part of the shooting time lag.

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Note 3 to entry: A capture point is often initiated from stand-by state by firmly depressing the shutter button to the maximum extent without introducing a discontinuity, see 3.8.

3.3
shutter release time lag
t_{RL}
time elapsed from pre-capture point (3.7) to the time of starting the exposure by reaching capture point after having stabilized the focus operation (often due to half pressing of the shutter button), in the case of digital still cameras that distinguish between pre-capture and *capture points* (3.8) (often the half pressing and the fully pressing of the shutter button)

Note 1 to entry: Instead of shutter release time lag, the terms shutter lag and release lag are used in some publications.

Note 2 to entry: A capture point is often initiated from pre-capture point by fully pressing down the shutter button.

3.4
start-up time lag
$t_{start\text{-}up}$
time elapsed between switching a digital still camera on and the moment the camera has reached a standby state (3.6) ready to shoot

Note 1 to entry: Start-up time lag excludes the initialization of a memory card.

Note 2 to entry: How this time is determined for the different devices is described in 5.2.1.

3.5
shooting rate
$f_{shooting}$
reciprocal of the time elapsed between the beginning of the exposure of an image until the beginning of the exposure of the next image, that is, between successive capture start states

3.6
standby state
state achieved following the power-up process, in which a digital still camera is powered on and ready to capture an image

Note 1 to entry: If the digital still camera uses an electronic viewfinder, a preview image is normally displayed during the standby state.

Note 2 to entry: Standby state excludes the initialization of a memory card.

3.7
pre-capture point
position of a user control of a digital still camera which activates pre-capture processes, such as auto-focus and exposure calculation

Note 1 to entry: The pre-capture point is typically reached by pressing an exposure button roughly halfway down on traditional digital still camera. On mobile devices with touchscreen this point might be reached by long pressing the trigger button.

3.8
capture point
position of a user control of a digital still camera which activates the image capture operation

Note 1 to entry: The capture point is typically reached by fully depressing the exposure button on traditional digital still cameras. On mobile devices with touchscreen this point can be reached either when pushing the trigger button, or releasing it.

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