International Standard

ISO 20954-1

Digital imaging — Measurement method for image stabilization performance —

Part 1: Optical systems

Imagerie numérique — Méthode de mesure de la perfomance de stabilisation de l'image —

Partie 1: Systèmes optiques

Second edition
2026-09

Reference number
ISO 20954-1:2026(en)

© ISO 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Measurement method **2**
4.1 General 2
4.2 Equipment and environment for measurement 3
4.2.1 Test chart 3
4.2.2 Lighting 3
4.2.3 Temperature and humidity 4
4.2.4 Vibration generator 4
4.2.5 Mounting of camera to be measured on vibratory apparatus 7
4.2.6 Vibration waveform 8
4.2.7 Shooting distance 9
4.3 Settings of camera to be measured 9
4.3.1 Shooting mode 9
4.3.2 Optical image stabilization mode 10
4.3.3 Image quality mode (compression ratio) 10
4.3.4 Image quality mode (number of recorded pixels) 10
4.3.5 Sensitivity 10
4.3.6 Flash 10
4.3.7 Electronic (digital) zoom 10
4.3.8 Focus control 10
4.3.9 White balance 10
4.3.10 Exposure 10
4.3.11 Aperture 10
4.3.12 Aspect ratio 10
4.4 Measurement procedures 10
4.4.1 Brief description of the procedures 10
4.4.2 Calculating value from captured image 12
4.4.3 Measurement of intrinsic image degradation amount 13
4.4.4 Measurement of total image degradation amount (for selection criteria I and II in 4.2.6) 13
4.4.5 Measurement of total image degradation amount (for selection criterion III in 4.2.6) 14
4.4.6 Action when total image degradation amount at peripheral measurement positions is not measurable 15
4.5 Calculation of optical image stabilization performance 15
4.5.1 Calculation of basic values 15
4.5.2 Method of converting intrinsic image degradation amount and measured image degradation amount into 35 mm film equivalent values 21
4.5.3 Calculation of optical image stabilization performance 21
5 Presentation of results **23**
5.1 Common requirements 23
5.2 Requirements for the nominal value 23
5.3 Requirements for the non-nominal value 24
5.4 Performance description of lens integrated camera with image stabilization mechanism 24
5.4.1 Lens integrated camera with image stabilization in roll direction 24
5.4.2 Lens integrated camera with image stabilization in yaw/pitch directions and without image stabilization in roll direction 24
5.5 Performance description of camera body with image stabilization mechanism 24
5.5.1 Camera body with image stabilization in roll direction 24

© ISO 2026 – All rights reserved

5.5.2 Camera body with image stabilization in yaw/pitch directions and without image stabilization in roll direction 24
5.6 Performance description of interchangeable lens with image stabilization mechanism 25
5.6.1 Interchangeable lens with image stabilization in yaw/pitch directions and without image stabilization in roll direction 25
5.7 Performance description for pairing a camera body with image stabilization mechanism and an interchangeable lens with image stabilization mechanism 25
5.7.1 Pairing with image stabilization in yaw/pitch/roll directions 25
5.7.2 Pairing with image stabilization in yaw/pitch directions and without image stabilization in roll direction 25
5.8 Examples of presentation 25
Annex A (normative) **Vibration waveforms** **27**
Annex B (informative) **CIPA test chart method** **29**
Annex C (informative) **Slanted edge test chart method** **31**
Annex D (informative) **Verification of vibration generator** **36**
Annex E (informative) **Additional information** **37**
Annex F (informative) **Description method in brochures** **57**
Bibliography **62**

© ISO 2026 – All rights reserved

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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 ISO/TC 42, *Photography*.

This second edition cancels and replaces the first edition (ISO 20954-1:2019), which was been technically revised.

The main changes are as follows:

— vibration waveform of a roll direction has been added along with the yaw and pitch directions;

— measurement at the 60 % of the image height in addition to centre has been required;

— determination level of image blur has been changed.

A list of all parts in the ISO 20954 series can be found on the ISO website.

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.

© ISO 2026 – All rights reserved

Introduction

The image stabilization function is important for digital cameras and has become a selling point in marketing materials. Therefore, the measurement methods and its reporting method are then very important to compare the image stabilization performance among cameras based on their brochures.

The Camera & Imaging Products Association (CIPA) issued CIPA standard DC-011 in 2012 to specify how to measure and describe the optical image stabilization performance of digital cameras. When image stabilization performance is measured and described according to that standard, end users have unbiased and useful information to help them select from a variety of digital cameras (see Bibliography).

This document is based on the CIPA standard, which is referenced in the Bibliography. The standardized measurement method primarily includes performance assessment with simulated handheld camera movements.

In response to subsequent changes in photographic viewing environments, this document has been revised to allow measurement and description of image stabilization performance for vibrations including roll motion, in addition to yaw and pitch motions.

© ISO 2026 – All rights reserved

Digital imaging — Measurement method for image stabilization performance —

Part 1: Optical systems

1 Scope

This document defines the measurement method of optical image stabilization performance for still images compensating for handheld blur consisting of three rotational components, yaw, pitch and roll.

It applies to consumer digital cameras with optical image stabilization for still images. Apparatuses such as camcorders and mobile phones with still image shooting functionality are within the scope of this document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

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

3.1
image stabilization
camera function that prevents *handheld blur* (3.3) by using a means of camera movement detection

Note 1 to entry: Even if a camera function uses a means of camera movement detection, it is not regarded as an image stabilization function if its primary means of blur mitigation is shortening exposure time based on exposure control program optimization.

3.2
optical image stabilization
function that compensates image displacement on the focal plane due to movement of a handheld camera by moving a part or whole of the optical system and/or image sensor, based on a means of camera movement detection

3.3
handheld blur
loss of image sharpness caused by movement of a handheld camera during exposure

3.4
stop
number that expresses a doubling or halving of the amount of light let in when taking a picture and which is typically represented by an exposure value

Note 1 to entry: For instance, the difference between exposure times of 1/1 000 s (Tv10) and 1/500 s (Tv9) or 1/125 s (Tv7) and 1/60 s (Tv6) is one stop.

© ISO 2026 – All rights reserved

Note 2 to entry: "Tv*n*" expresses that time value of APEX equals to *n*. See Annex C of Reference [5] for APEX.

3.5
handheld blur threshold
level of *handheld blur* (3.3) at which *image stabilization* (3.1) performance is determined

Note 1 to entry: In this document, this level is 20 µm of motion in the focal plane on one frame of 35 mm film, where one frame means the picture size (24 mm × 36 mm).

3.6
average vibration angle
expected deflection angle of camera rotation under handheld vibration during exposure

Note 1 to entry: The handheld vibration is given as the vibration waveform data that is specified in this document.

Note 2 to entry: The average vibration angles are given as amount of angle in degrees of each exposure time as shown in Figure 13. The values are statistical expectation and are calculated from average of oscillation amplitude from peak to bottom of the vibration waveform when certain exposure time is applied.

3.7
35 mm film equivalent focal length
focal length of a lens attached to a camera with a sensor size of 24 mm × 36 mm (originated from 35 mm film) that produces the same field of view as the camera system with a lens at a given focal length for which the 35 mm sensor equivalent focal length is specified

3.8
image height
<of DSC> distance between an image point and the centre of the imaging area or its relative expression which is the value normalized by one half of the diagonal of the image area

Note 1 to entry: "DSC" is an abbreviation for "digital still camera" or "digital camera".

Note 2 to entry: In this document, the image height is expressed as percentage normalized by the distance from the centre to the corner of the imaging area.

[SOURCE: ISO 17850:2015, 3.2.1, modified —Notes 1 and 2 to entry have been added.]

4 Measurement method

4.1 General

The objective of this document is to specify how to measure optical image stabilization performance of a camera held in the user's hands. Accordingly, a measurement session would better simulate a real shooting situation if the camera was actually held by a test photographer. However, this makes it difficult to eliminate variation among individual photographers or how well the camera is designed for handheld shooting. In order to cancel these effects, the test camera shall be mounted on a vibration generator that shakes the camera with a simulated handheld vibration waveform, and image stabilization performance shall be measured with images of a test chart specified by this document.

This document specifies two waveforms that simulate the important characteristics of how a camera shakes when it is held by hand. These waveforms were developed by analysing extensive measurement data and adding further theoretical observations. Both waveforms contain three rotational components, yaw, pitch and roll.

This document stipulates that, in addition to the evaluation of the image stabilization performance at the centre of the image, where the influence of yaw and pitch blur are primarily observed, the evaluation on the periphery of the image is to be conducted, where the influence of roll blur becomes more significant than at the centre of the image.

© ISO 2026 – All rights reserved