IEC 62676-5-1

Edition 1.0 2024-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Video surveillance systems for use in security applications – Part 5-1: Data specifications and image quality performance for camera devices – Environmental test methods for image quality performance

Systèmes de vidéosurveillance destinés à être utilisés dans les applications de sécurité – Partie 5-1: Spécifications des données et performances de la qualité d'image pour les dispositifs de caméra – Méthodes d'essai d'environnement pour les performances de la qualité d'image

IEC 62676-5-1:2024-07(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 62676-5-1

Edition 1.0 2024-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Video surveillance systems for use in security applications – Part 5-1: Data specifications and image quality performance for camera devices – Environmental test methods for image quality performance

Systèmes de vidéosurveillance destinés à être utilisés dans les applications de sécurité – Partie 5-1: Spécifications des données et performances de la qualité d'image pour les dispositifs de caméra – Méthodes d'essai d'environnement pour les performances de la qualité d'image

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 13.320

ISBN 978-2-8322-9345-4

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

VIDEO SURVEILLANCE SYSTEMS FOR USE – IN SECURITY APPLICATIONS –

Part 5-1: Data specifications and image quality performance for camera devices – Environmental test methods for image quality performance

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC 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, IEC had not 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 https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62676-5-1 has been prepared by IEC technical committee 79: Alarm and electronic security systems. It is an International Standard.

This International Standard is to be used in conjunction with IEC 62676-5:2018.

The text of this International Standard is based on the following documents:

Draft	Report on voting
79/704/FDIS	79/709/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62676 series, published under the general title *Video surveillance systems for use in security applications*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

The goal of this document is to define the performance test methods for image quality, a feature of video surveillance systems which is subject to change depending on the environmental conditions (temperature and humidity).

VIDEO SURVEILLANCE SYSTEMS FOR USE – IN SECURITY APPLICATIONS –

Part 5-1: Data specifications and image quality performance for camera devices – Environmental test methods for image quality performance

1 Scope

This part of IEC 62676 is an extension of IEC 62676-5 which defines measuring methods for performance values of video surveillance camera equipment and defines image quality tests under the given temperature and humidity environment.

This document is mainly targeting cameras with integrated lenses as the lenses are a major component that can impact the results. If the lens is selectable, the lens will be stated together with the results.

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.

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 62676-5:2018, *Video surveillance systems for use in security applications – Part 5: Data specifications and image quality performance for camera devices*

3 Terms, definitions and abbreviated terms

3.1 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:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
colour temperature
numerical value used to indicate the chromaticity of a light source that has a spectral distribution of (or close to) the radiation generated when heat is applied to a blackbody radiator

3.1.2
gain
camera's function to amplify the electronic signal

3.1.3
image
visual representation of a scene shown through the camera

Note 1 to entry: The term "image" in this document shall include multiple images within an image stream.

3.1.4
image quality
precision with which an image reproduces the captured scene

Note 1 to entry: Image quality is measured as a collection of parameters like sharpness, brightness, colour reproduction, resolution, uniformity of illumination, contrast, image distortion (see IEC 62676-5).

3.1.5
resolution
ability of a camera or video system to reproduce the details of the original scene

3.1.6
stable temperature
state reached when the internal object temperature changes less than 0,1 °C for a period of 5 min, with a measurement integration time of > 10 s

3.1.7
field of view
angle at which a camera can capture an image through the lens

Note 1 to entry: The field of view is expressed as a horizontal field of view, a vertical field of view, and a diagonal field of view.

3.2 Abbreviated terms

AGC automatic gain control
CPU central processing unit
MTF modulation transfer function
s-SFR sine-based spatial frequency response

4 Test environment

4.1 Overview

Clause 4 provides general conditions of the test environment and equipment configuration necessary for the evaluation of image quality in accordance with the temperature and humidity conditions during operation of a video surveillance system.

4.2 Test environment configuration

Standard measurement conditions shall follow IEC 62676-5:2018, 5.1.

Measurement shall be at a room temperature of 23 °C ± 2 °C.

4.3 Measurement environment

The measurement environment shall follow IEC 62676-5:2018, 5.3.

As environmental testing is required, the test equipment shall be placed into an environmental chamber to change environmental conditions. An example of the measurement environment is shown in Figure 1.

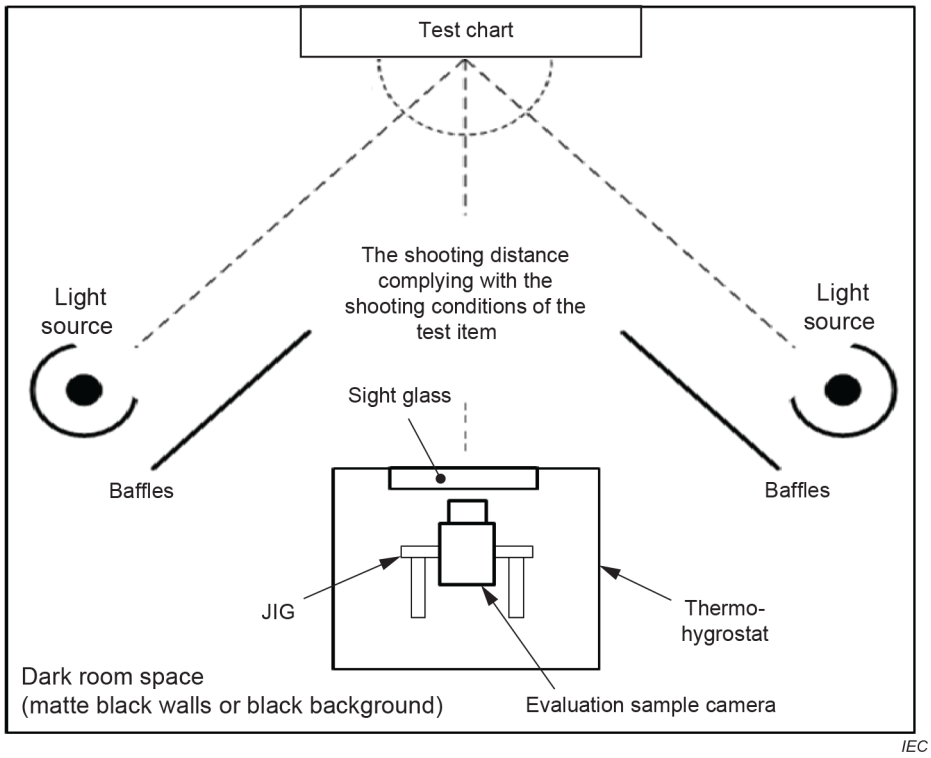

Figure 1 – Example of measurement environment

The structure of the test equipment consists of a thermo-hygrostat chamber with a sight glass, an evaluation sample camera, a jig (for horizontal or vertical control of the evaluation sample camera), a chart (test chart), a light source, and baffles. The test lab shall be a dark space (matte black walls or a black background).

Only the evaluation sample camera shall be placed in the thermo-hygrostat chamber. Other measurement equipment such as test chart, light source and others shall not be placed inside the thermo-hygrostat chamber because specifications are not guaranteed in conditions different from room temperature.

The distance between the evaluation sample camera and the sight glass shall be as close as possible to avoid reflection or other optical issues.

When a 3 100 K light source is irradiated, the illuminance attenuation of 50 % or less shall be maintained compared to the conditions without a sight glass. See Annex A for the method of measuring the sight glass illuminance attenuation rate.

NOTE Baffles are used to prevent the light source from directly irradiating the evaluation sample camera, but it can be removed if the camera is not influenced by the configuration of the test lab.

5 Test

5.1 General test conditions

General test conditions shall follow IEC 62676-5:2018, 5.3.

5.2 General standard photographing conditions

5.2.1 Lighting conditions

Lighting conditions shall follow IEC 62676-5:2018, 5.1.2.1.

5.2.2 Field angle

Field angle shall follow IEC 62676-5:2018, 5.1.2.4.

5.2.3 Lens iris

Lens iris shall follow IEC 62676-5:2018, 5.1.2.5.

5.2.4 Standard camera settings

Standard camera settings shall follow IEC 62676-5:2018, 5.1.2.6.

5.3 Image quality

5.3.1 Resolution

5.3.1.1 General

To evaluate the resolution change as part of the image quality in the environmental conditions of video surveillance system cameras, the sine-based spatial frequency response (s-SFR) measurement method defined in IEC 62676-5:2018, 5.4.2.4, shall be used.

In IEC 62676-5:2018, 5.4.2.3, the visual resolution method using a resolution chart to determine the visibility of the wedge pattern is introduced. This method can be used where it is not possible to apply the s-SFR method requiring video capture and calculation on a personal computer.

In case the visual resolution method is used it shall be reported together with the results.

5.3.1.2 Camera setting conditions

The camera setting conditions shall be in accordance with the general camera standard settings in 5.2.4, except for the items listed in Table 1.

In the case where it is possible to have the settings indicated in Table 1 (or other similar settings) below, such settings shall apply.

Table 1 – Camera settings for resolution

Item	Settings
Automatic gain control (AGC)	OFF
Gain	0 dB

For cameras that cannot be set as above, use the default values (factory default settings).

High CPU load (e.g. multi-stream, multi-codecs, high-bandwidth output, etc.) can lead to increase of the internal temperature of the camera and can affect the results. If the test is done in a different setting from above, the conditions shall be stated with the result.

5.3.1.3 Prior test of sight glass impact

The optical characteristics (e.g. modulation transfer function (MTF)) of the sight glass are usually not defined and are unknown. Therefore, the effect on resolution measurement shall be measured beforehand to test whether the sight glass can qualify the resolution measurement with the target camera to be tested. The degradation of resolution with and without the sight glass shall be less than 10 %. If the resolution degradation result is greater than 10 %, this measurement shall be done with another thermo-hygrostat chamber that fulfils this requirement.