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Photography — Digital still cameras — Battery life measurement

Photographie — Caméras numériques — Mesurage de la durée de vie de la batterie

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Foreword

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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*.

Introduction

For digital cameras, long battery life is one of the important features. The Camera and Imaging Products Association (CIPA) defined a CIPA standard “Procedure for Measuring Digital Still Camera Battery Consumption” for specifying a standard measurement procedure. The procedure gives useful information on battery life to end-users for making a selection from a variety of digital cameras.

This International Standard is based on the CIPA standard mentioned above and it is referenced in the Bibliography. The standardized measurement procedure primarily includes high power-consuming functions such as image display on picture monitor, use of flash, and zoom and retractable lens movement.

Photography — Digital still cameras — Battery life measurement

1 Scope

This International Standard specifies measurement method of battery life for consumer-use digital still cameras (hereinafter referred to as "DSC").

2 Terms and definitions

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

2.1
number of shots
number of pictures shot by a digital camera under the conditions stipulated in the measurement procedure in this International Standard

3 Measurement method

3.1 General

a) All the still-photography functions shall be utilized to their full extent when the measurement is conducted. The functions which have nothing to do with taking still photography (e.g. audio-recording and movie-recording functions) need not be activated during the measurement.

b) The camera's function-setting parameters, except those defined in this International Standard, shall be identical to factory shipping settings. If the measurement is conducted with parameters that are different from the factory shipping settings, such settings parameters shall be reported along with the measurement results. If certain setting parameters are not defined by the factory shipping settings (see Annex B), the measurement shall be conducted using the settings which are most likely employed by the users of the applicable cameras, and information which can identify such setting parameters shall be reported along with the measurement data.

c) Some of the functions whose test conditions are defined in this International Standard may be ignored if a camera to be measured is not equipped with those functions.

d) If the power level is not fully determined by the factory shipping setting, the measurement shall be made with the operation that result in the highest power demand level for the camera.

Summarized priorities for the above a), b) and c) are as follows.

— The measurement conditions of the standard procedure which are listed in 3.2 to 3.8.

— Function-setting parameters which are not listed in 3.2 to 3.8 shall be identical to the factory shipping settings.

— If any parameters cannot be defined by the factory shipping settings, such parameters shall be set to ones which are assumed to be most likely employed by the users of the applicable cameras.

3.2 Battery

a) Battery type is not specified for the measurement, but information that can identify the battery shall be reported along with the measurement results.

b) When using a primary battery, a new battery shall be used. When using a secondary battery (rechargeable battery), the battery shall be fully charged (see Annex B).

3.3 Recording media

Not specified, but information that can identify the recording media shall be reported along with the measurement results.

3.4 Camera settings

3.4.1 Image quality mode

The factory shipping mode shall be used.

3.4.2 Number of recorded pixels

The factory shipping mode shall be used.

3.5 Measurement conditions

3.5.1 Subject distance

Not specified.

3.5.2 Subject to be shot and brightness

Subject to be shot is not specified. The subject brightness shall be within the range of the camera's AE system, if automatic exposure (AE) is used.

3.5.3 Operating environment

Measurements shall be made at (23 ± 2) °C and relative humidity (50 ± 20) %.

3.6 Required actions

3.6.1 Flash usage

Full flash shall be used for one of every two shots. For the other shot, the flash shall not be used. Any given shooting condition for the full illumination flash may be used.

3.6.2 Motor driven optical zoom operation

The motor driven optical zoom lens shall be moved either from the TELE end to the WIDE end or from the WIDE end to the TELE end before every picture is taken. The zoom lens may be moved either as TELE → WIDE → TELE or as WIDE → TELE → WIDE with every two shots. Nothing is specified on its movement during the measurement other than the motor-driven optical zoom operation.

3.6.3 Picture monitor mode

a) The picture monitor shall be turned on at all times to be used as the electric viewfinder during the measurement. If the picture monitor turns off automatically during the measurement or if it automatically shifts into other display modes, it shall immediately be turned back into the viewfinder mode either by an automatic or manual operation (except replacing batteries or power cycling) and the test shall be continued. For cameras equipped with two or more picture monitors, the test can be conducted with only the most power consuming one turned on at all times.

b) If the picture monitor is equipped with an illumination function (e.g. backlight), the illumination shall be lit for the duration of the test. If the brightness or the contrast of the monitor is adjustable, the adjustable parameter shall be set at the factory shipping setting when the measurement is made.

NOTE See Annex B.

3.6.4 Handling when the recording medium is full

The files in the medium shall be deleted immediately with the function in the camera or the medium shall be replaced with an empty one. If replacement is to be done, tester shall minimize the influence on the battery life with the replacement. For example, the tester shall replace the medium when the power is off. It is acceptable to delete files or replace the medium before it becomes full.

3.6.5 Handling of playback mode

Nothing is specified regarding the playback mode including automatic playback (the function for displaying images automatically immediately after they are shot).

3.6.6 Shooting intervals

The first shot shall be made 30 seconds after the power is turned on. During that 30-second period, the flash mode setting, zoom operation and other preparations setting for shooting shall be made. Thereafter, shooting shall be made at a rate of one picture every 30 seconds. If 30 seconds is not sufficient for initialization, or if the camera is not ready for shooting in 30 seconds after a shot, shooting shall be made immediately when the camera becomes ready.

3.6.7 Power off

Power shall be turned off after every tenth picture has been shot and processed. The interval before the next power-on shall be enough time not to affect battery life (i.e. so that any additional off time will not change the measurement results).

NOTE See Annex B.

3.7 End-of-test criteria

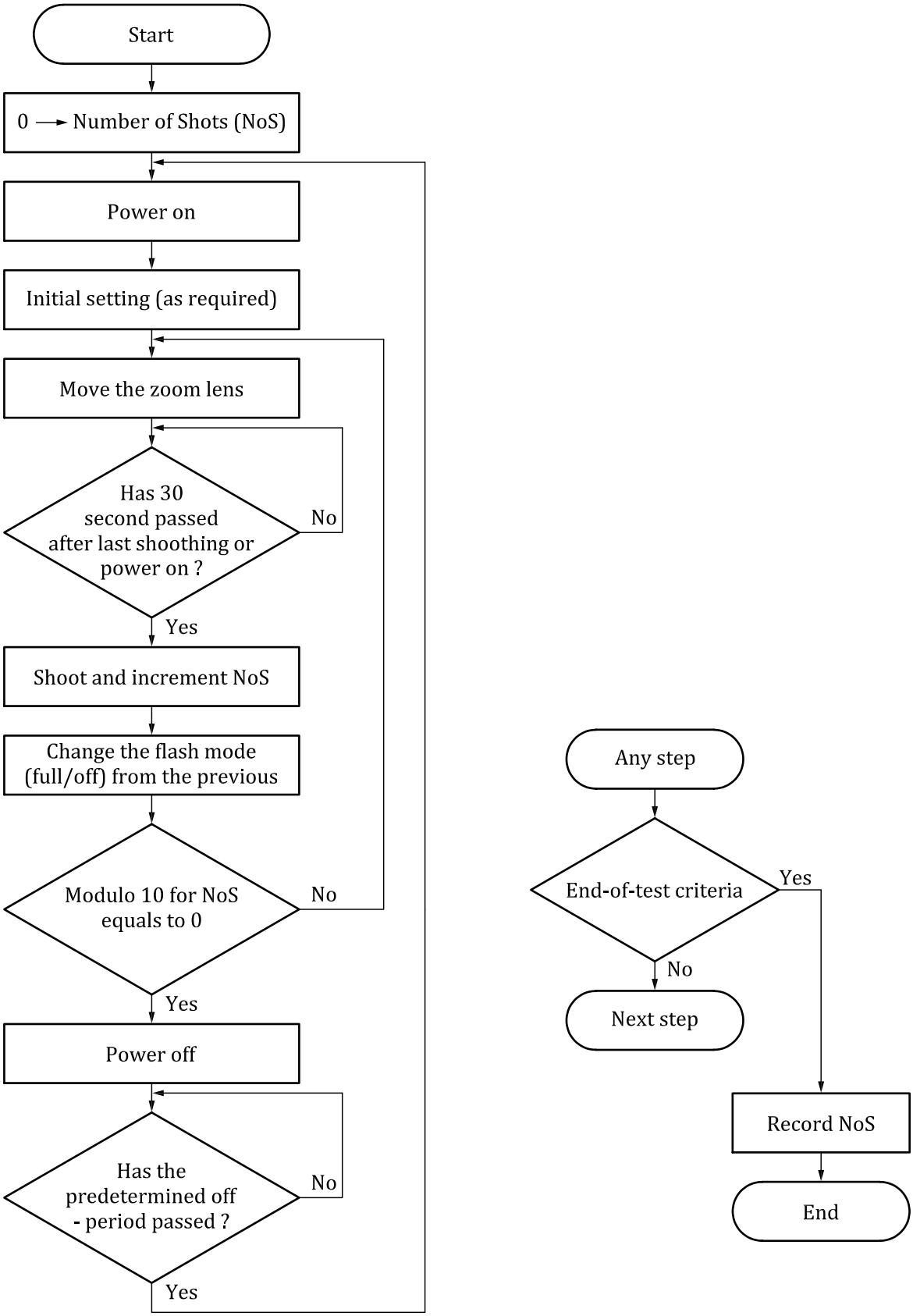
The measurement shall be finished when the first low-battery shutdown occurs or when any function related to still photography stops working without low-battery shutdown.

However, if the function can be reactivated automatically or manually (except replacing batteries or power cycling), the function shall be reactivated immediately and the test shall be continued.

NOTE See Annex B.

3.8 Measurement flowchart

The measurement may follow the flowchart in Figure 1.



The measurement shall end when it meets the End-of-test criteria at any step of the procedure.

Figure 1 — Measurement flowchart

4 Reporting the results of battery life

4.1 General rule

Only the number of shots shall be reported as battery life result. However, “battery life” may be replaced with “possible number of shots,” “number of recordable pictures” or “number of shots.”

4.2 Battery

Information (at least model name or type) which identifies the kinds of batteries used shall be reported. If the batteries used in the measurement are equivalent to the battery bundled with the camera, the description “Bundled batteries are used” may be used.

4.3 Recording media

Information (at least model names or types) which identifies the kinds of media used shall be reported. If the media bundled with the camera, the description “Bundled media are used” may be used.

4.4 Function-setting and shooting mode

If the measurement is made using a function-setting or shooting mode different from the factory shipping setting, such measurement conditions shall be reported, except under the conditions set forth in the stipulations in this International Standard.

Annex A
(informative)

Example description

A.1 Example 1

Number of pictures that can be shot: XX

(Based on the ISO 20087 and using the batteries and memory card bundled with the camera)

A.2 Example 2

Battery Life: XX pictures (ISO)

Recording medium: YY (YY indicates model of medium)

Batteries used: AA size Alkaline batteries

A.3 Example 3

Battery Life: XX pictures (Based on ISO standard), YY pictures (Based on manufacturer's standard*)

Recording medium used: 32 MB ZZ (ZZ indicates model of medium)

Batteries used: Made by XX, AA size Nickel-Hydrogen battery

* Manufacturer's own measurement method: Measurement is based on our own standard: The liquid crystal display is set to "OFF"; other items are the same as the ISO standard.

A.4 Example 4

Battery Life: XX pictures

[Batteries (type XYZ) supplied with camera, and separately sold recording media ABCD were used. Shooting was performed with the mode-dial at AUTO.]

A.5 Example 5

Number of shots: XX pictures (Nickel-Hydrogen batteries supplied with the camera)

YY pictures (AA size Alkaline battery)

Using built-in memory media

Annex B
(normative)

Additional information

B.1 General

This Annex gives a supplementary explanation.

B.2 Definition of digital camera battery life

In this measurement standard, "digital camera battery life" is used to designate how many pictures can be recorded without either changing or recharging the batteries. It does not indicate either the number of times the batteries themselves can be recharged or other characteristics of the batteries.

B.3 Measurement results

Using the factory shipping settings is based on the assumption that manufacturers make such settings the defaults because they are the settings that most users will select for the particular model. That is, they are the settings most likely to be used in most situations. However, in some cases, the factory shipping setting does not properly determine the setting to be used for the measurement. For example, in the case of a camera whose power switch also works as the function dial, the dial may be shifted as "off → replay → Automatic shooting → Manual shooting." If the power switch is at the factory shipping setting (power-off) for this model, the measurement is obviously impossible. To avoid the confusion in such cases, when parameters are not determined by the factory shipping setting, the measurement shall be conducted under the setting that is assumed to be most likely chosen by users of the applicable model (e.g. automatic shooting), and information that can identify the setting shall be reported along with the results.

In addition, it may be assumed that the function-setting cannot always set the power level. For instance, there is a mechanism whereby one of the manipulations of the zoom-lever controls the rotation of the zoom-motor. In this mechanism, the more deeply the lever is pushed, the faster the rotor rotates. For such a mechanism, the function-setting cannot specify the power consumed by the zoom-motor. In such cases, making full use of the power available for such functions shall be used.

B.4 Full charge status of secondary batteries

The full charge status of a secondary battery is defined as the status achieved by charging the battery following the procedure specified in the user's manual for the camera or the battery charger. However, it should be noted that when using certain kinds of batteries or charging procedures, a battery which is only slightly undercharged can be overcharged through the recharging, thus ending up demonstrating better performance than normal. To prevent such a situation, a battery shall be completely discharged before recharging.

B.5 Variations in measurement data due to battery differences

Batteries (regardless of their type) will have varied capability due to such factors as temperature, use conditions, individual differences, time elapsed since manufacture, and (in the case of rechargeable batteries) the number of times recharged. Today's digital cameras typically consume a large amount of power, and there is a large variation particularly among alkaline batteries. It is not unusual for alkaline batteries purchased off the shelf to vary in lifetime by a factor of two or more.

B.6 End-of-test criteria and picture monitor mode

As a basic rule, the measurement should be considered finished when the first low-battery shutdown occurs after the measurement starts. However, there may be cameras that are able to continue shooting with only some of the functions disabled in the case of shortage of the battery. For example, the picture monitor may no longer be "on" but the optical finder can be used to shoot pictures. The measurement for this type of situation would violate the requirement in 3.1 of "All the still-photography functions shall be utilized to their full extent when the measurement is conducted." and is therefore not acceptable. It is with this type of situation in mind that the requirement in 3.7 is stated as follows: "The measurement shall be finished when the first low-battery shutdown occurs or when any function related to still photography stops working without low-battery shutdown." However, there are cameras with power-saving features such as shutting down the picture monitor when the flash is charging and restoring the display after the flash is charged. Making this situation unacceptable would make it impossible to conduct battery life measurements for such a camera. To relieve such inconvenience, an exception is added in 3.1 b). For similar reasons, this wording is adopted also with regard to the picture monitor in 3.6.3.

Although some models are equipped with two or more picture monitors, it is reasonable to assume that all of the picture monitors are rarely in use at one time. Accordingly, for this type of model, it is stated that "the test can be conducted with only the most power consuming one turned on at all times" in 3.6.3 a).

B.7 Handling of power off time

Many digital cameras are designed to extend or retract the lenses automatically when power is turned on and off. Each time the power is turned on or off, such cameras use up considerable power for lens movement. Moreover, since today's digital cameras tend to consume power at a high rate, it is not hard to imagine that users will tend to turn the power on and off frequently.

With this reality in mind, the procedure herein includes steps that power is to be turned off after every ten pictures are shot. The issue here is how much power-off period is appropriate. According to the experiments, there are some types of cameras that show a large difference in residual battery life between long and short power-off periods, especially with cameras running on alkaline batteries A long power-off time often results in fewer shots. It has also been reported that even with a short power-off time, removing the batteries from the camera and leaving them at room temperature has similar result to long power off time.

Based on the above findings, the measurement procedure is specified in 3.6.7 as "The interval before the next power on shall be as much time as needed, without affecting battery life (any additional off time will not change the measurement results)."

In the actual measurements, a power-off time of 60 minutes is recommended as the long power-off period in the case of a camera with such characteristics and using alkaline batteries. Whereas a power-off time longer than 60 minutes or more than a few days is not uncommon in actual use, it is impractical to take a power-off time longer than several hours when conducting measurements. Accordingly, in this International Standard, a 60-minute power-off period should be used as the representative of long power-off periods. However, since this would still require considerable testing time, the time may be shortened as in the examples below.

EXAMPLE 1 Experimentally determine an extrapolation factor between 10-minute power-off periods and 60-minute power-off periods. Conduct the actual testing at 10-minute power-off periods and extrapolate to 60-minute power-off period results.

EXAMPLE 2 During the power-off period, remove the batteries from the camera and leave them at room temperature (for 10 min to 15 min) in order to obtain results similar to those for 60-minute power-off periods.

A large variation in battery life due to the length of the power-off period is a feature of some cameras and battery types but does not occur with others. It is also conceivable that the degree of this difference will vary with the product and battery. Naturally, products unaffected by this factor may be measured using any desired power-off period. For reasons such as these, the decision as to the appropriate length of power-off periods is made the responsibility of each test organization or individual.

Bibliography

[1] CIPA DC-002-2003 “Standard Procedure for Measuring Digital Still Camera Battery Consumption”

ICS 37.040.99

Price based on 9 pages