Standard of the Camera & Imaging Products Association

CIPA DC-002-Translation - 2003

Standard Procedure for Measuring Digital Still Camera Battery Consumption

This translation has been made based on the original Standard (CIPA DC-002). In the event of any doubts arising as the contents, the original Standard is to be the final authority.

Established in December 17, 2003

Prepared by
Standardization Committee

Published by
Camera & Imaging Products Association

GOOGLE-1043

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Standard Procedure for Measuring Digital Still Camera Battery Consumption

Introduction For digital cameras, long battery life is one of the features regarded as important. However, until now, digital camera manufacturers have been measuring their cameras' battery life using their own methods, making it difficult to compare the battery life performance data listed in manufacturers' catalogs. To cope with this inconvenience, the Camera & Imaging Products Association has defined this "Procedure for Measuring Digital Still Camera Battery Consumption." By specifying the standard measuring procedures for high power-consuming functions such as color image display activation, use of flash, and zoom and retractable lens movement, comparable data can be made available to help end-users make a selection from a variety of digital cameras.

1. Scope This Standard applies to consumer-use digital still cameras (hereinafter referred to as "DSC"). When listing the battery life in catalogs, the measuring procedure listed in this Standard shall be used.

2. Measurement

2.1 Prerequisites

a)The basic rule for conducting the measurements is that all of the still-photography functions of the digital camera shall be utilized to their full extent. Non-still photography functions (e.g. audio- and movie-recording functions) need not be activated during the measurements.

b)The camera's function-setting parameters, except those defined in this measurement procedure, shall be basically identical to the default settings at the factory. If the measurement is conducted under different parameters from the default settings at the factory, such settings shall be reported along with the measurement data. If certain parameter data are not defined by the default settings at the factory (see Explanatory Notes), the measurements shall be made using the setting parameters that the manufacturer assumes will most likely be employed by the users of the relevant cameras, and information which can identify such setting parameters shall be reported along with the measurement data.

c)If the camera to be measured is not equipped with some of the functions whose test conditions are defined in this standard, such measurement items can be ignored.

Priorities are given for the above conditions as follows:

1. The measurement conditions of the standard procedure defined in the following clauses (2) and up in this chapter.
2. Functional parameters not listed here shall be identical to the default setting at the factory.
3. If any parameters cannot be defined by the default settings at the factory, such parameters shall be what the manufacturer assumes will most likely be employed by the users of the relevant cameras.

d)In the case where the power level of a certain function can be set regardless of the parameter for such functional setting, the measurement shall be undertaken with the default power level at the factory setting. If the power level of a certain function does not have a default factory setting, the power level shall be set at the highest level of the available setting.

2.2Batteries used

a)The use of particular battery types is not specified, but information that can identify the batteries used (e.g. the type of 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 Explanatory Notes).

2.3 Image quality mode The factory-set mode shall be used.

2.4 Pixel number (Number of recorded pixels) The factory-set mode shall be used.

2.5Flash photography Full illumination flash shall be used for one of every two pictures taken. For the other pictures, the flash shall not be used. (Any given shooting condition for the full illumination flash may be used.)

2.6 Object distance Not specified.

2.7 Subject and brightness Not specified. If automatic exposure is used (or applied), the scene brightness shall be within the range of the camera's AE system.

2.8Recording medium The recording medium is not specified, but information that can identify the medium (e.g. the type of the medium) shall be reported along with the measurement results.

2.9 Motor driven optical zoom operation Before every picture is taken, 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. It is also acceptable to move the zoom lens either as TELE→WIDE→TELE, or as WIDE→TELE→WIDE before every second picture is taken. Except for the motor driven optical zoom operation, nothing is specified for other zoom operations such as a digital zoom operation.

2.10 AE/AF operation The AE/AF operation shall be done in accordance with the default factory setting. No procedure is set forth herein for the operation.

2.11 Operating environment Measurements shall be made at 23°C ± 2°C, Relative Humidity (RH) 50% ± 20%.

2.12 Use of moving image and audio Not specified.

2.13 White balance Not specified.

2.14 Shake compensation Not specified.

2.15 End-of-test criteria (see Explanatory Notes)

a)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.

b) However, if the stopping function can be reengaged automatically or manually (other than by replacing batteries or reengaging electric power), the stopping function shall be reengaged immediately and the test shall be continued.

2.16 Color monitor on/off mode (see Explanatory Notes)

a)For the duration of the test, the color monitor shall be lit continuously in the mode in which it can be used as the viewfinder. If during the test the color monitor turns off automatically, or if it automatically shifts into other modes, it shall immediately be turned back into the viewfinder mode either by an automatic or manual operation (other than by replacing batteries or power cycling), and the test shall be continued. For cameras equipped with two or more color monitors, the test can be conducted with only the most power consuming one lit continuously.

b)If the color 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 color monitor is adjustable, the adjustable parameter shall be set at the factory setting when the measurement is made.

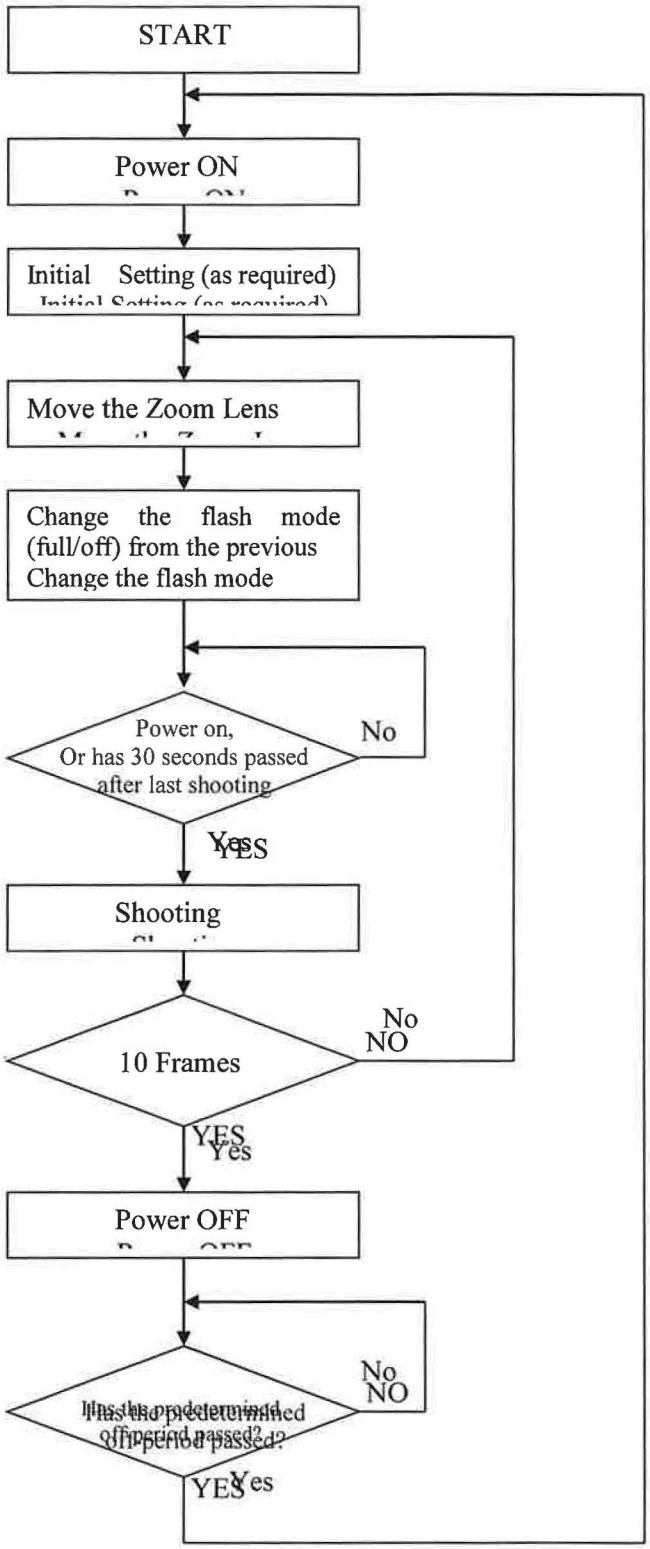
2.17 Handling when the recording medium is full The files in the medium shall be deleted immediately using the function in the camera itself, or the medium shall be replaced with an empty medium. If replacement is to be done, care shall be taken to affect the battery consumption as little as possible by, for example, replacing the medium when the power is off. It is acceptable to delete files or replace the medium before it becomes full

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

2.19 Shooting intervals Shooting shall begin 30 seconds after the power is turned on. During that 30-second interval, the flash mode setting, zoom operation and other preparations for shooting shall be made. Thereafter, shooting shall proceed 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 30 seconds after a shot, shooting shall resume immediately after the camera reaches its ready state.

2.20 Power off frequency and intervals (see Explanatory Notes) Power shall be turned off after every 10th picture has been shot and processed. The interval before the next power-on shall be as much time as needed, without affecting battery life (i.e. so that any additional off time will not change the measurement results). It shall be the responsibility of each manufacturer to determine the appropriate length of the off time.

3. Measurement example (flowchart)



4. Descriptions

4.1 Application The descriptions with regard to the battery consumption of digital still cameras shall be made in accordance with the following stipulations regardless of the explanatory or advertising media (hereinafter referred to as "Media"). The items 4.4 through 4.6 listed below shall be included without failure in the specification and/or performance list, etc., if the list is published.

4.2 Definition of the number of shots stipulated in Article 2 of this Standard. The number of shots shall mean the number of pictures shot by the digital camera under the conditions stipulated in the measurement procedure in this standard.

4.3 Description method for battery consumption

4.3.1 General rule for this Standard: Only the number of shots measured under the conditions stipulated in this CIPA Standard for Measuring Battery Consumption shall be described. However, "Battery Consumption" may be replaced with "Possible Number of Shots," "Number of Recordable Pictures" or "Number of Shots."

4.3.2 Exception: Although the number of shots measured under the manufacturer's own procedure may be described as well, the number of shots measured under this CIPA Standard for Measuring Battery Consumption shall be described with first priority, and the manufacturer's own data shall be presented near to those of the CIPA Standard but in a less noticeable manner.

4.4 Measuring procedure

4.4.1 General rule: The term "based on the CIPA Standard for Measuring Battery Consumption" may be abbreviated to "based on the CIPA Standard," "based on CIPA," or "CIPA."

4.4.2 Exception:

a) If a description saying that the measurement was made in accordance with this CIPA Standard for Measuring Battery Consumption is patently written in the same explanatory or advertising media or in other media, the description of the measuring method may be omitted.

b) If the number of shots according to the manufacturer's own measuring method is intended to be described additionally, the following notes shall be incorporated near the description of the number in a noticeable manner: the fact that the number of shots is based on the manufacturer's own measuring method; and an explanation of the measuring method. (It is acceptable to first explain any differences from the CIPA method, followed by "other measuring methods are the same as those of CIPA.")

4.5 Batteries

4.5.1 General rule: Information (at least model names or types) which identifies the kinds of batteries used shall be included.

4.5.2 Exception: If the batteries used in the measurement are equivalent to those supplied with the camera for retail sale, the description "Batteries supplied at sale are used" may be used.

4.6 Recording media

4.6.1 General rule: Information (at least model names or types) which identifies the kinds of media used shall be included. If the media supplied with the camera at sale are used, the description "Media supplied at sale are used" may be used.

4.6.2 Exception: If a description saying that the measurement was made in accordance with the CIPA Standard for Measuring Battery Consumption is patently written on the same explanatory or advertising media that includes information regarding the number of shots, or in other media, the description of the recording media used may be omitted.

4.7 Function-setting and shooting mode

If the measurement is made using a function-setting or shooting mode different from the factory default-setting, such measurement conditions shall be described, except under the conditions set forth in the stipulations in this CIPA Standard for Measuring Battery Consumption.

* See example descriptions listed in Section 4.8 for actual examples.

4.8 Example Descriptions

Example 1)

Number of pictures that can be shot: XX
(Based on the CIPA Standard and using the batteries and memory card supplied with the camera)

Example 2)

Battery Life: XX pictures (CIPA)
Recording medium: YY (YY indicates kind of medium)
Batteries used: AA size Alkaline batteries

Example 3)

Battery Life: XX pictures (Based on CIPA Standard), YY pictures (Based on manufacturer's Standard)
Recording medium used: 32 MB ZZ (ZZ indicates kind 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 CIPA Standard.

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.)

Example 5) An example with omitted measurement description (2-3(3)2)a), and omitted media description (2-3(4)2))
Battery Life: XX pictures (Batteries supplied with the camera)

Example 6)

Number of shots: XX pictures (Nickel-Hydrogen batteries supplied with the camera)
YY pictures (AA size Alkaline battery)
Using built-in memory media

Explanation

This section gives a supplementary explanation of matters indicated or referred to in this specification , and of related matters. It is not part of the specification itself.

1. Definition of digital camera battery consumption In this measurement standard, "digital camera battery consumption" 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.

2. Measurement results Given the different features of various cameras sold by manufacturers, it is impossible to achieve exactly the same measurement conditions for each camera. In addition, individual differences of the same model cameras and variations among batteries themselves (as noted below) are likely to result in measurement variability. In deciding a standard measurement procedure under these circumstances, the following principles are used:

- Manufacturers are responsible for the fairness of the reported results.
- Measurements shall be made with all the still-photography functions of the digital camera utilized to their full extent.
- For measurement conditions that are not specified, the factory settings shall be used.

The first principle is based on the understanding that some manufacturers will report only the measurement results, while others will also report an error margin. By reporting results in such ways, however, the manufacturers leave themselves open to complaints from users, etc.; and it is expected that each manufacturer will take sufficient account of this when reporting results.

The decision to have measurements taken using the factory-set parameters 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 setting does not properly determine the setting to be used for the measurement. For example, in the case of a camera whose on/off switch also works as the function changing dial, the dial may be shifted as "off→replay→Automatic shooting→Manual shooting." If the on/off switch is at the factory setting (off) for this model, the measurement is obviously impossible. To avoid confusion in such cases, when parameters are not determined by the factory setting, the manufacturer shall conduct the measurement under the setting that is assumed to be the most likely to be chosen by users of the particular model (e.g. automatic shooting), and information that can identify the setting shall be reported with the results.

In addition, it may be assumed that the functional setting can not 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 functional setting can not specify the power consumed by the zoom-motor. In such cases, making full use of the power available for such functions is specified.

3. 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

charger. However, it must 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 must be completely dischared before recharging.

4. Variations in measurement data due to battery differences As is well known, 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.

Therefore, even when measurements are undertaken using the procedure defined in this standard, it must be noted that users will not necessarily be able to replicate the results in every case. Manufacturers need to understand this in deciding how much error margin to incorporate in their reported results, and do so at their own risk.

5. End-of-test criteria and color monitor on/off mode As a basic rule, the measurement should be considered finished when the first low-battery shutdown occurs after the measurement starts. There are cameras, however, that are able to continue shooting with only some of the functions disabled; for example, the color monitor may no longer be "on" but the optical finder can be used to shoot pictures. This measurement, however, would violate the rule that "measurements shall be made with all the functions relating to still photography activated to their full extent," and is therefore not acceptable. It is with this type of situation in mind that the requirement is stated as follows: "If some function related to still photography stops working, this shall be considered the end of the test even if the low-battery shutdown has not occurred." However, there are cameras with power-saving features such as shutting down the color monitor when the flash is charging, and restoring the display after the flash is charged. Disallowing this situation would make it impossible to conduct battery consumption measurements for such a camera. To relieve such inconvenience, an exception is added as follows: "If, however, the stopped function can be restored by an automatic or manual operation (other than by replacing batteries or power cycling), it shall be restored immediately and the test shall be continued." For similar reasons, this wording is adopted also with regard to the color monitor in Section (16).

Although some models are equipped with two or more color monitors, it is reasonable to assume that all of the color monitors are rarely in use at one time. Accordingly, for this type of model, it is stated that "the test can be conducted lighting only the most power-consuming monitor continuously."

6. 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 the stipulation that power is to be turned off after every 10 pictures are shot. The issue here is how much off time is appropriate. Experiments indicate that, especially with cameras running on alkaline batteries, there are some types of cameras that show a large difference in residual battery life between long and short off periods. A long off time often results in fewer photos shot. It has also been reported that even with a short off time, results similar to those for a long off time can be obtained by removing the batteries from the camera and cooling them at room temperature.

Based on the above findings, the measurement procedure is specified 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 conducting of the measurements, in the case of a camera with such characteristics and using alkaline batteries, an off time of 60 minutes is recommended as the long off period. Whereas an off time longer than 60 minutes or more than a few days is not uncommon in actual use, it is impractical to take an off time longer than several hours when conducting measurements. Accordingly, in this standard, it was decided to use a 60-minute off period as the representative of long 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 off periods and 60-minute off periods. Conduct the actual testing at 10-minute off periods and extrapolate to 60-minute off period results.

(Example 2)During the off period, remove the batteries from the camera and cool them (for 10 to 15 minutes) in order to obtain results similar to those for 60-minute off periods.

It must be noted that a large variation in battery life due to the length of the 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 off period. For reasons such as these, the decision as to the appropriate length of off periods is made the responsibility of each manufacturer.

7. Deliberation Committee The deliberations for the drafting of this Standard were conducted mainly by a sub-working group under the Technical Working Group of the Standardization Committee, namely the Battery Life Sub-Working Group.
The committees involved in drafting the Standard are as follows:

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* Note that the development of this Standard was initiated by the Battery Life Sub-Working Group (Chief: Yasuo Nakajima, SEIKO EPSON CORPORATION, until March 2002) in the Digital Camera Technical Sub-Committee under the former Japan Camera Industry Association (dissolved in July 2002), which was then taken over and since then has been conducted by the Camera & Imaging Products Association Resolution-Working Group.

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CIPA DC-002-Translation-2003

Published in December, 2003

Published by Camera &Imaging Products Association
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