Guideline for Digital Camera Specifications

CIPA DCG-002 -Translation -2007

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

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Contents

Specification Guideline for Digital Cameras

1. Introduction

As for the guidelines about the notations used in catalogs and other documents of digital still cameras, we already have "JCIA GLA03 Guideline for Noting Digital Camera Specifications in Catalogs, Revised Version", CIPA DCG-001-2005, and we also have relevant CIPA standards for battery life, resolution and sensitivity. Based on those documents, digital camera suppliers have prepared catalogs and other materials throughout the world, which has been contributing to the fair competition in the market. This new Guideline is published in order to establish specification guidelines for digital still cameras including new specification items in addition to the existing provisions.

2. Scope

This guideline shall be applied to the digital still cameras for consumer use. This guideline need not be applied to those items, such as for business or industrial uses, for which individual and special specifications are agreed between the users and the manufacturers. This guideline is intended to be used mainly in catalogs and other printed materials in which product specifications are noted, or to be used as notations in the relevant software. This guideline should also be observed in notations on the camera body, the individual packaging box, the sales promotion POP and so on, as well as in the activities of the advertisement and the publicity.

3. Guideline for specifications

(1) Basic concepts of the guideline

To contribute to the sound progress of our industry through encouraging the fair competition, this guideline is established on the basic concepts as follows:

(1-1) This guideline stipulates the notation or the verbal expression of the specified items when they are described in catalogs or other documents, and does not obligate to describe such items in catalogs and other documents.

(1-2) This guideline does not require or stipulate the specification values that the product must achieve. The reason for the above is:

Each specification value (performance) in a product has close relationship with other specification values (e.g. size and cost), and they tend to vary with the time and through the development of technology. Suppliers decide the specification values of their own products based on their estimation of the product's market competitiveness, and they respect the feedback from the market. Any industrial guidelines for the specification values that the products must provide, would probably impede the technical progress, interfere the fair market competition and hinder the sound development of the industry.

(1-3) As for the use of Japanese prolonged sound symbols and the distinction between single-byte and double-byte characters, variations in expressions such as customary names and company-used names may be allowed unless they cause significant misunderstandings, excepting that:

- Explicit stipulation of unified use of any items given in this guideline shall be observed.
- Item names that may cause any confusion with other items defined in this guideline shall not be used.

(1-4) The values set on factory shipping (or the default values) shall be used in the first place for the specification values of items. When noting such specification values, measurement conditions for the default value may be omitted from the report. If values other than those set on factory shipping are to be reported additionally, the measurement conditions for those values must be reported as well. However,

- For those functions that cannot be used with factory default setting, the noted values shall be those under conditions when such functions are set available.
- If there exist any parameters or modes that cannot be fixed with the settings given on factory shipping, use a setting, which is expected most likely to be used by users. However, if the selection of that setting may affect the specification values, then the setting shall be reported.

(1-5) In the case of cameras with interchangeable lens, it is essential to note the specification values for the condition with the lens placed in position. Selection of the lens is left to the supplier's discretion, but the conditions (the name or type of the lens, etc.) must be specified for the items for which specification values vary with the types of lens.

(1-6) If the basic concept of this guideline stipulated herein differs from the details stipulated individually for each item, the latter shall have the preference.

(1-7) It is essential to note the specification values based on the measurements of the

product. For the specification values of items for which any lucid and exact method of measurement has not been established, the values that are based on the product design may be used for notation.

(1-8) Regardless of the stipulated number of significant figures for each item, the number of decimal places may be omitted in the notation of an integer value.
Examples: 4.0 times → 4 times; 2.0 seconds → 2 seconds; 2.0m → 2m

(2) Definition of terms

The terms used in this guideline are defined as follows:

(2-1) output image: Unless otherwise specified, this term means both the image to be recorded in the recording medium and the image output from the camera through any communication means.

(2-2) preferred notation: This term means "to note the wording solely, or in the case of noting plural terms, to note the specified term more conspicuously than the others".

(2-3) factory shipping condition: This term means the factory default settings including parameters and modes of the product.

(2-4) About the stipulation of the name of items etc.:
{xxx} means that xxx may be omitted in the description, and [yyy/zzz] means that either yyy or zzz may be selected in the description.

(3) Reference standards

(3-1) List of reference standards

1) CIPA DCG-001–2005: Guideline for Noting Digital Camera Specifications in Catalogs (Revised Version)
2) CIPA DC-002–2003: Standard Procedure for Measuring Digital Still Camera Battery Consumption
3) CIPA DC-003–2003: Resolution Measurement Methods for Digital Cameras
4) CIPA DC-004–2004: Sensitivity of digital cameras
5) JCIS 27-1997: Method of indicating mass and dimensions of camera
6) ISO 517:1996: Photography -- Apertures and related properties pertaining to photographic lenses -- Designations and measurements
7) ISO 516:1999: Photography -- Camera shutters -- Timing
8) ISO 15739:2003: Photography -- Electronic still-picture imaging -- Noise measurements
9) ISO 14524:1999: Photography -- Electronic still-picture cameras –Method for measuring optoelectronic conversion functions (OECFs)
10) ISO 12232:2006: Photography -- Digital still cameras -- Determination of exposure index, ISO speed ratings, standard output sensitivity, and recommended exposure index
11) ISO 12233:2000: Photography -- Electronic still-picture cameras -- Resolution measurements

12) IEC61747-1:2003: Liquid crystal and solid-state display devices - Part 1: Generic specification
13) IEC61146-2:1997 Video cameras (PAL/SECAM/NTSC) - Methods of measurement - Part 2: Two- and three-sensor professional cameras
14) EIAJ ED-2522: Measuring methods for Matrix Liquid Crystal Display modules

(3-2) Response to revision of reference standards

When any standards to which this guideline refer are revised, the following response shall be taken:

- For standards controlled by Camera & Imaging Products Association (CIPA), the revised edition shall be observed.
- For other standards, the provisions described in this guideline shall be observed until this guideline is reviewed.

(4) Guidelines for specifications

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
1	focal length {of the lens}	This means the distance along the optical axis between the secondary (/ backmost) principal point and the focus when focusing on a subject at infinity. ♦ Conditions etc.: (1) The value based on the design may be reported. (2) The value shall be noted in units of mm. (3) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). ♦ Examples of notation: - 3.5 mm - 3.5 to 10.5 mm	• Interchangeable lens and other products with which the focal length can be measured in the form of marketable goods shall comply with ISO 517:1996. • Any lucid or accurate measurement method in product form has not been established in fixed-lens DSCs. • For lenses used commonly, the shooting angle of view (the diagonal angle) can be calculated by using the formula: $2 \times \tan^{-1}$(diagonal length of image area / (2 x (focal length of lens))).
2	35 mm {film} equivalent focal length {of the lens}	This means the focal length of a DSC lens converted into that of 35 mm film camera lens that has the same input field angle as the DSC lens. Details must comply with CIPA DCG-001. ♦ Conditions etc.: (1) Diagonal length of image area shall be used for the basis of conversion. (2) The value shall be noted in units of mm. (3) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal).	
3	[f-number/aperture]	This means the f-number = f/D, where f is focal length of the lens and D is the effective aperture of the lens. Details shall comply with ISO 517:1996. ♦ Conditions etc.: (1)Notation of only the open-aperture f-number or notation including information of other aperture, whichever is selectable. In the case of zoom lens, however, it is recommended to report both the max wide angle (W) and max telephoto (T) . In addition, the minimum open-aperture f-number in the entire zoom range shall be reported. (2) When reporting the aperture for which an ND filter used together, use the equivalent f-number which apply the same light value as the aperture, and also add a "description that suggests the concurrent use of an ND filter". (3) Record the equivalent f-number for Exif. (4) The value based on the design may be reported. ♦ Examples of notation: • F2.8 (W)/F4.8 (T)/F5.6 (M) • F2.8 (W) to 5.6 to 4.8 (T) • F2.8 (W)/F5.6 (T) (use ND filter together)	• Any lucid or accurate measurement method in product form has not been established in fixed-lens DSCs

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
4	zoom [ratio/magnification]	• If the camera has only an optical zoom function, select the description (b), • If the camera has only a digital zoom function, select the description (c), • If the camera has both functions, the optical zoom function shall be noted in the highest priority.	
	(a) [total/combined] zoom [ratio/magnification]	This means the total zoom magnification that combines optical zoom and digital zoom. ♦ Conditions etc.: (1) The optical zoom magnification shall be reported conspicuously. (2) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). ♦ Examples of notation: • 3 times in optical zoom (12 times in total zoom magnification) • 3 times in optical zoom (12 times in total zoom magnification/4 times in digital zoom) • 3 times in optical zoom, 4 times in digital zoom (12 times in total zoom magnification)	
	(b) optical zoom [ratio/magnification]	This means the ratio of lens focal length at the max telephoto (T) position to that at themax wide angle (W). ♦ Conditions etc.: (1) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). (2) The details (whether actual value or nominal value is used, etc.) of the focal length value used in the calculation of optical zoom ratio are not stipulated. ♦ Examples of notation: • 3.8 times • 5 times	The measured "effective zoom ratio (zoom ratio by the ratio of the size of shot image)" at a measurable subject distance has a significant difference from the real zoom ratio calculated from the real focal length (subject distance ∞).
	(c) digital zoom [ratio/magnification]	This means the ratio of the diagonal length of image area without the digital zoom function to the same with the said function. ♦ Conditions etc.: (1) Image area is defined pursuant to CIPA DCG-001. (2) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). (3) "shooting digital zoom" can be shortened to "digital zoom" (refer to Item 48). ♦ Examples of notation: • 3.5 times • 5 times	
5	[focus/shooting] [range/distance]	This means the subject distance at which shooting results in a proper picture. The shortest shooting distance means the distance on the closest side. Use the distance from front surface of the lens or the distance from the effective image area of the image sensor. Which to select for this item is left to the supplier's discretion, on condition that the selected distance shall be expressly described. ♦ Conditions etc.: (1) For the AF mode, report the distance at which the AF function works in-focus, and for the MF mode, report the distance of in-focus condition that conforms to the relevant supplier's standard. (2) If the longest shooting distance is ∞, reporting only the shortest shooting distance may be permitted. (3) Conditions for shooting mode (macro mode etc.) and max wide-angle and max telephoto shall be reported. (4) The conditions for f-number of lens are not stipulated. (5) It is recommended that the number of significant figures to be noted should be one or more for less than 1m distance and two or more for 1m or longer distance (round the value to the nearest decimal). ♦ Examples of notation: • 50cm to ∞ (W-end), 1.5m to ∞ (T-end) (from lens surface) • Shortest shooting distance 50cm (W-end), 1.5m (T-end) (from lens front) • 0.5m to ∞ (W-end), 1.5m to ∞ (T-end) (from effective image area) • 1 to 50cm (W-end) (from lens surface when in macro mode)	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
6	lens [construction/configuration]	This means the construction of lens (number of groups, number of pieces, etc.). ♦ Conditions etc.: Terms and contents of description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: • 14 pcs in 10 groups (3 aspherical lenses, 1 low dispersion lens) • 7 pcs in 3 groups (1 double-side aspherical lens, 1 cemented lens)	
7	shutter type	This means the system of shutter. ♦ Conditions etc.: Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: • Electronic system along with mechanical shutter • Focal-plane shutter	
8	shutter speed	This means the range of available shutter speed. Details shall comply with ISO 516:1999. ♦ Conditions etc.: (1) If any values that are available in any mode other than factory-shipping mode are reported together, the shooting mode in which users can achieve such reported values shall be noted. (2) It is not prohibited to report together the whole range of shutter speed that the camera can achieve, if the meaning of the reported value is expressly described. ♦ Examples of notation: • 1 to 1/2000 second, 15 to 1 second (long shutter mode) • 1/2000 to 8 second (automatic), 60 second at maximum (bulb mode) • 1 to 1/1500 second (automatic mode), 15 to 1/1500 second (throughout all shooting modes)	
9	[light/exposure] metering [system/mode]	This means the metering system and modes used for exposure control. ♦ Conditions etc.: Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: • TTL open-aperture metering • Center-weighted metering • Spot metering • Multiple pattern metering • Evaluative metering	
10	exposure [mode/control]	This means the available system and modes of exposure control. ♦ Conditions etc.: (1) Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. (2) This term may be put in Item 16, "shooting mode". ♦ Examples of notation: • Program AE • Shutter (speed) priority AE • Lens aperture priority AE • Manual exposure	
11	effective subject brightness value range	This means the range of subject brightness that allows the user to shoot a "practically exposed" image without using flash. ♦ Conditions etc.: (1) The definition and decision of "practical exposure" may be left to the relevant company. (2) The camera shall be set in condition of the factory shipping with flash excitation being prohibited. If it is not possible to prohibit the flash from being excited, the value should be evaluated with a subject at a distance that is too far for the flash beam to reach the subject. (3) APEX value is recommended for notation. ♦ Examples of notation: BV3 to 13 (W-end), BV4 to 14 (T-end)	
12	exposure range	This means the range of controllable exposure. ♦ Conditions etc.: (1) The value can be calculated from the variation range of the APEX value of lens aperture (AV) and the APEX value of shutter speed(TV): EV = AV + TV (2) APEX value is recommended for notation. ♦ Examples of notation: EV 6 to 16 (W-end), EV 7 to 17 (T-end)	
13	exposure compensation	This means whether or not the camera is equipped with an exposure compensation function. If the function is provided, the range and the step of the compensation should be noted. ♦ Examples of notation: • ±2 stages (1/3 stage step) • ±2 EV (1/3 EV step)	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
14	focus [system/mode/type]	This means the system and the available modes of focus control. ♦ Conditions etc.: Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: • Central one-point AF • Multiple point AF (9 points) • 9-point AF • Manual focusing • One-shot AF • TTL phase difference detection system (Manual focusing/One-shot AF/Continuous AF)	
15	white balance [system/mode/control]	This mean the system and the applicable modes of white balance control. ♦ Conditions etc.: Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: • Auto/Fine/Cloudy/Fluorescent/Incandescent/Flash/Set mode/Manual • Preset (Sunlight/Cloudy/Fluorescent/Incandescent/Flash)	
16	[scene/shooting] mode	This means the types of shooting modes (scene selection etc.) that the user can select according to the conditions of the subject etc. This item may be taken as a wide meaning including exposure control mode etc. ♦ Conditions etc.: Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: Normal/Easy shooting/Macro/Portrait/Sports/Nightscape/Night-scene portrait/Fireworks/Snow/Starry sky/and so on	
17	motion blur suppression	This is a generic term for image stabilization and motion blur reduction. The term "blur" may be replaced with other expressions of "camera shake" or "subject blur", if necessary.	If the function may be classified into either of (a) and (b) because the function has the nature of both (a) and (b), the classification of the function may be left to the relevant company.
	(a) image stabilizer	This means the method of correction and/or suppression of blur in the output image caused by the motion of the camera body (camera shake etc.) and/or the motion of the subject by using the output of blur detection means. ♦ Conditions etc.: (1) The system name, mode and other data shall be reported (if the camera is equipped with this function). (2) System name, mode name and other data may observe the customary terms or the designations used in the relevant company. ♦ Examples of notation: • Optical system • OIS • Shift of image sensor • Image processing system • Bracket system	
	(b) motion blur reduction {mode}	This means the function or mode to decrease the blurring of output image caused by motion of either the subject or the camera by shooting at a high-shutter speed through optimizing the exposure control program (control of any one of lens aperture, shutter speed and sensitivity). Independent description of this function as a motion blur reduction function or mode is allowable, although this function is a kind of the exposure control mode or the sensitivity control mode. ♦ Conditions etc.: The mode names, function names and other descriptions may observe the customary terms or the designations used in the relevant company. ♦ Examples of notation: • Blur decrease mode • Blur reduction function	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
18	flash	This means whether the camera is provided with a built-in flash or whether it accepts the mounting of external auxiliary flash, where a flash means a light source which emits a flash light. ♦ Conditions etc.: (1) The designations may observe the customary terms or those used in the relevant company. (2) If the camera accepts the mounting of external flash, it is recommended to report examples of available flash.	
19	{built-in} flash mode	This means the applicable flash modes. ♦ Conditions etc.: Terms and contents of the description may observe the customary expressions or the designations used in the relevant company. ♦ Examples of notation: • Auto, Forced flash, Banned flash, Red eye reduction automatic, Slow sync.	
20	{built-in} flash {working} range	This means the range of distance in which flash helps the user take a practical picture. ♦ Conditions etc.: (1) If this item is to be reported, the distance range shall be reported. (2) The flash range shall be a value for photographing in condition which is dark enough for using the flash light. (3) The most closest distance (a) The practical level of the picture quality may be left to the decision by the relevant company. (b) The value shall be reported if it is longer than the [minimum/shortest] shooting distance of the camera. (c) Whether to apply (b) to the macro mode or to add some comments may be left to the discretion of the relevant company. (4) The [maximum/farthest] distance The level of the practical picture quality may be left to the discretion of the relevant company. (5) The number of significant figures to be noted shall be one or more for less than 1m distance and two or more for 1m or longer distance (round the value to the nearest decimal). ♦ Examples of notation: • 0.5 to 5m (W-end), 1.5 to 3.5m (T-end) • 0.5 to 3.0m (standard), 30 to 50cm (macro)	
21	{built-in} flash guide number	This means the amount of flash light. Use the value for ISO speed 100, in units of meter (if this item is to be reported). ♦ Conditions etc.: (1) The customary notation that omits the unit (m) may be used. (2) Addtional report of the value for other ISO speed than 100 is allowable. In this case, the ISO speed value shall also be reported. ♦ Examples of notation: • Gno.7 (ISO 100•m), Gno.14 (ISO 400•m) • Gno.7 • GN7, GN14 (ISO 400•m)	
22	image sensor		
	(a) [system/type]	This means the classification of image sensor (type, system, etc.). ♦ Conditions etc.: Expression may observe the custom. ♦ Examples of notation: • CCD • CMOS sensor	
	(b) size	This means the size of image sensor. ♦ Conditions etc.: Expressions may observe the custom. ♦ Examples of notation: • 1/2.5 type • 36 x 24 mm • 35 mm format film size • APS-C	Some examples of notation are given in CIPA DCG-00.

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23	{[picture/LCD]} [monitor/display]		
	(a) [system/type]	This means the form of {picture/LCD} monitor. ♦ Conditions etc.: Expressions may observe the customary terms. In case of a monochrome monitor, it shall explicitly be reported. ♦ Examples of notation: • Transflective TFT liquid crystal display • TFT liquid crystal display • Organic EL	
	(b) image size	This means the image size on the {picture/LCD} monitor, where the size means the dimensions of the area excluding all sections that do not contribute to the display of images or characters. ♦ Conditions etc.: Expressions may observe the customary terms. ♦ Examples of notation: • 2.5 type • 75 mm diagonally	
	(c) {number of} [pixels/dots]	This means the number of effective pixels or dots of {picture/LCD} monitor, where the number means the effective pixels or dots of the area excluding all sections that do not contribute to the display of images or characters. Incidentally, the relationship between the number of pixels and the number of dots is that: three dots of consecutive R, G and B dots constitute one pixel in a display by three primary colors, R, G and B. (refer to IEC61747-1:2003) ♦ Conditions etc.: (1) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). (2) It is recommended to note the value in the unit of 10,000 in Japanese, and in the unit of 1,000 (or k) in English. ♦ Examples of notation: • 215,000 dots • 72,000 pixels	
	(d) [defect/defective {pixels}]	This means the pixels that do not shine according to the received signals as they should normally do, or more specifically, those pixels that have significant difference in their output from the other pixels so that the user can clearly perceive the defect.	
	(e) maximum luminance	This means the monitor brightness (luminance) when the maximum signals (255 in the case of 8bit digital signal) are given in a white window pattern. The provision of this item, however, shall be limited only to the standard and measurement method in the darkroom condition, where the darkroom condition means a condition in which the luminance on the measured surface is not affected by any external light. (This guideline does not define the maximum luminance in different environments). ♦ Conditions etc.: (1) If the camera has a brightness adjustment function, set the brightness to the maximum. (2) Reflective type monitors is out of scope of this stipulation. (3) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). ♦ Examples of notation: 210cd/m^2 or higher	• Details of measurement method must observe JEITA standard, EIAJ ED-2522. • This performance expresses the characteristics in the darkroom condition, but it does not express characteristics in various environments. • Note that the luminance of liquid crystal display has a trade-off relationship with other liquid crystal display performance (contrast, color reproduction characteristics, reflectance, etc.).

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
	(f) [{picture} coverage/field of view]	• When displaying a recorded image: The term means the percentage (%) of the image range shown on the monitor to the recorded image. • When displaying the scene for shooting: The term means the percentage (%) of the image range shown on the monitor to the range of image to be recorded. ♦ Conditions etc.: (1) Two values in the width (horizontal) and height (vertical) directions shall be reported respectively. (2) If the difference in the monitor coverage between horizontal and vertical directions is small, two values may be unified into one, using the root-mean-square (rms) of the values for the two directions. (3) Use the values on the centerline of image (the width monitor coverage is defined on the horizontal line at the vertical center and the height monitor coverage is defined on the vertical line at the horizontal center) (4) If the monitor coverage values are different between the play back picture and the shooting picture, it shall be noted which occasion the reported value is meant for. (5) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). ♦ Examples of notation: • 96% • Approximately 100% • 97% (for shooting), 100% (for display)	
24	viewfinder		As for the electronic viewfinder, the details that are not stipulated here should conform to the guideline for picture monitors stipulated in Item 23.
	(a) [system/type]	This means the type of viewfinder. ♦ Conditions etc.: Expression may observe the custom. In case of a monochrome monitor, it shall explicitly be reported. ♦ Examples of notation: • Optical viewfinder • Viewfinder of single-lens reflex camera optics • Liquid crystal EVF • TFT color liquid crystal viewfinder	
	(b) [{picture} coverage/field of view]	This means the percentage (%) of the range of the image seen in the viewfinder to the range of the recorded image. • If the difference in the viewfinder coverage between horizontal and vertical directions is large, it is recommended to report two values in the width (horizontal) and height (vertical) directions respectively. • If the difference in the viewfinder coverage between horizontal and vertical directions is small, two values may be unified into one, using the root-mean-square (rms) of the values for the two directions. • Use the values on the centerline of image (the width viewfinder coverage is defined on the horizontal line at the vertical center and the height viewfinder coverage is defined on the vertical line at the horizontal center) • If the value changes greatly by zooming, it is recommended to report both the values at two points of the max telephoto (T) position and max wide angle (W). • If the range of image to be recorded is smaller than the range that is seen in the viewfinder, then the notation of the monitor coverage will exceed the value of 100%. In such cases, it is recommended to report the range to be recorded expressly. ♦ Conditions etc.: (1) The view point shall be set at the center when in measurement. (2) The subject should be at the distance of 3m in principle. If the value at the other distance than 3m is to be reported, then that distance shall be noted together. (3) The number of significant figures to be noted shall be two or more (rou ♦ Examples of notation: • 93% • Horizontal; 85%; vertical: 96% • 80% (W-end), 90% (T-end)	

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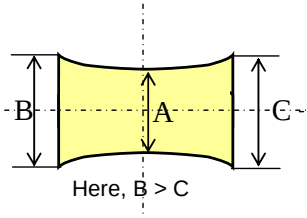
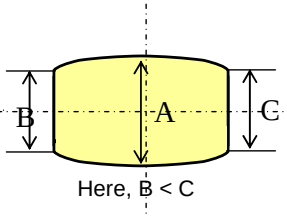
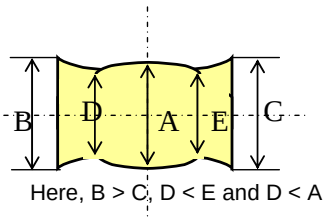
	(c) parallax	This means the gap between the center of visual field and the center of recorded image in the vertical and horizontal directions. ♦ Conditions etc.: (1) Express the gap in the percentage (%) to the number of horizontal and vertical pixels of the recorded image. (2) Subject distance and other data shall be expressly noted although they are stipulated here.	
	(d) [diopter/dioptric] adjustment	This means whether the camera is provided with a viewfinder adjustment function (mechanism) or not. ♦ Conditions etc.: (1) If the function is provided, it is recommended to report the purport together with its adjustment range (only the range may be noted, suggesting that the function is provided). (2) Note the adjustment range in units of m^{-1}, with the positive and negative signs (+, -) relative to the reference diopter scale. ♦ Examples of notation: diopter scale adjustment range -3 to + 1 m^{-1}	
	(e) eye point	This means the position at which the photographer can see all area of the picture and all information in the viewfinder. ♦ Conditions etc.: (1) To express the position, use the maximum distance from the "position that is the closest to the photographer out of the structural components around the camera's eyepiece frame" or the "rear end of the camera's eye piece including the protection glass" to the "position at which the pupil can see all screen pictures and all information in the viewfinder". It shall be expressly noted which value is used, unless "position closest to the photographer out of structural components around the camera's eyepiece frame" is used. Further, "position closest to the photographer out of structural components around the camera's eyepiece frame" may be defined as the position where any structural components removable from the camera's eyepiece frame such as the eye cap, are removed. (2) The number of significant figures to be noted shall be one or more for shorter s than 10 mm distance and two or more for 10 mm or longer distance (round the value to the nearest decimal). ♦ Examples of notation: eye point 21 mm (from the rear end of the camera's eye lens)	♦ (Recommended) method of measurement: Place a douser that has a pinhole with a diameter of 2 mm or smaller between the viewfinder and the observer on the optical axis of the viewfinder, and move the pinhole along the optical axis of the viewfinder until the observer can see all screen pictures and all information in the viewfinder. Then take the position of pinhole as the "position at which the pupil can see all screen pictures and information in the viewfinder".
25	[recording/storage] capacity	This means the number of images that can be stored in the recording media. ♦ Conditions etc.: (1)The following conditions that have strong relationship with the number of recorded images shall be described expressly. • The number of recorded pixels (including the aspect, if necessary) • Compression mode (fine, standard, normal, etc.) • The type of recording media used (xD, CF, SD, MS, etc.) and its nominal capacity. In the case of recording to the built-in memory, the capacity only for recording images shall be noted. (2) It is recommended to describe notes, saying, "this is only a yardstick", "this is the minimum value" or "this depends on the shooting subjects", for example. (3) The designation and details of compression mode may be left to the relevant company.	
26	{[image/recording/storage]} file format	Comply with CIPA DCG-00. RAW files shall be treated as "Original file format". It shall be expressly described that RAW and other unique formats are "Original file format". ♦ Examples of notation: • RAW (original) • CCD-RAW (original format) • RAW (needs special software)	
27	number of effective pixels	Comply with CIPA DCG-001.	
28	number of recorded pixels	Comply with CIPA DCG-001.	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
29	[sound/audio] codec	This means the sound codec system available for still picture recording with audio, for example. ♦ Conditions etc.: Expression may observe the custom. ♦ Examples of notation: • WAVE (monaural) • G.726 • MP3 (stereo) • AC-3 (monaural)	
30	[movie/video] {[clip/capture]}	This guideline does not cover this item because it is a secondary function in DSC.	
31	sensitivity	Coply with CIPA DC-004.	
32	[defect/defective {pixels}]	This means the pixels that do not supply the output signals as they should normally do, or more specifically, those pixels that have significant difference steadily in their output from the other pixels so that the user can clearly perceive the defect.	• This guideline does not stipulate any method of measurement. • This word indicates a defect for the camera unit, instead of a defect of individual parts.
33	resolution	Coply with CIPA DC-003.	
34	signal to noise ratio	Coply with ISO 15739:2003.	
35	[optoelectronic conversion function/tone characteristics]	Coply with ISO 14524:1999.	
36	dynamic range	Comply with ISO 15739:2003.	
37	distortion	This means the distortion of image defined as (B-A)/2V, where B, A and V are the number of pixels of the output image, and they are defined as follows: suppose a rectangular subject that is similar to the image area of recorded image/output image, shoot the subject so that it is inscribed in the screen, and then let the maximum/minimum value of the height of the output image around the center of the screen long sides be (A), let the minimum/maximum value of image height at the screen left and right ends be (B), and let the number of recorded pixels of height direction of output image be (V) (1) If the image distortion is so complicated that the height, A, does not constitute the maximum value or the minimum value in the screen from which 10% portions are removed at the left and right ends, then determine the maximum or minimum value, D, in the screen from which 10% portions are removed both at the screen left and right ends, and use (B-D)/2V for notation. (2) The height means the length of image in the short side direction, and the left to right direction means the long side direction. ♦ Conditions etc.: (1) It is recommended to add the shooting conditions (lens focal length, su (2) The value shall be expressed in percentage (%). (3) The number of significant figures to be noted shall be two or more (rou ♦ Examples of notation: +2.5% (W-end, subject distance 2m)  Here, B > C  Here, B < C  Here, B > C, D < E and D < A	This guideline selected screen picture distortion as an item to indicate the image distortion after concluding that it would be easier for general consumers to recognize the index of screen picture distortion that indicates how correctly a straight line of a subject is reproduced as an accurate straight line than the index of optical distortion that indicates how correctly the distance from the optical center is reproduced (i.e., to indicate how correctly a perfect circle of a subject is reproduced into a perfect circle). In addition, we consulted IEC61146-2 that stipulates screen picture distortion of video camera when discussing the measurement method.

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
38	luminance non-uniformity	This means the ratio of the difference between the maximum luminance signals level inside the screen for evaluation, $M^{2.2}$ and the minimum luminance signals level inside the screen for evaluation, $m^{2.2}$ to the maximum luminance signals level inside the screen for evaluation when a subject of uniform luminance is photographed(= 1 - (m / M)2.2) , where M and m refer to the average value of adjacent horizontal H-area x vertical V-area (H is the area 2% or less of the horizontal recorded image, and V is the area 2% or less of the vertical recorded image). ♦ Conditions etc.: (1) It is recommended to add the shooting conditions (f-number of lens, focal length, etc.) that remarkably affect the luminance shading. Unless the maximum value by the shooting conditions is to be reported. (2) The value shall be in percentage (%) (3) The number of significant figures to be noted shall be one or more for less than 10%, and two or more for 10% or more (round the value to the nearest decimal). (4) The screen range for evaluation shall be noted clearly. ♦ Examples of notation: • 53% or less (W-end, max-aperture lens aperture, in the whole screen) • 42% or less (inside the screen excluding the surrounding 5% frame) • 33% or less (inside the screen of image height 80% or less)	
39	color non-uniformity	This guideline does not cover this item.	It is not possible to uniquely define the method of measurement because each color has different characteristics and for other reasons. In the future, we will discuss the need for consideration after due progress of technology level.
40	white balance	This guideline does not cover this item.	This guideline does not cover this item even as performance standard because it is not possible to define the targeted characteristics. Colorimetric white balance is different from white balance of digital camera.
41	color reproduction	This guideline does not cover this item.	This guideline does not cover this item even as performance standard because it is not possible to define the targeted characteristics. Colorimetric color reproduction is different from color reproduction of digital camera (example: it is impossible to evaluate memorized colors etc. by means of colorimetric performance).
42	[power-up/start-up] [response/time]	This means the duration after turning on the camera power until the system has entered in the standby state ready for shooting (*), where the "standby state ready for shooting" means the condition in which the system have attained at least two requirements: i) system can observe the subject, and ii) the system can accept the first release, where "accept the first release" means the condition in which the system can conduct exposure control and AF control (if the camera is in AF mode on factory shipping). (1) In the case of cameras without the optical viewfinder and with an LCD or other image display unit, : Report the elapse time after turning on the power supply until a shooting image (through-image) appears or the elapse time after turning on the power supply until the system becomes ready for accepting the first release, whichever is longer (2) In the case of cameras that have only an optical viewfinder: Report the elapse time after turning on the power supply until the system becomes ready for accepting the first release. (3) For cameras that have both LCD or other image display unit and an op Report preferably the time defined in above (1) if the image display unit is ♦ Conditions etc.: (1) The conditions of battery etc. may be left to the relevant company. (2) The conditions of subject may be left to the relevant company. (3) It is recommended that the number of significant figures to be nated sh ♦ Examples of notation: • 1 second • 1.5 seconds, 0.9 seconds (when flash is turned OFF)	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
43	shutter release time lag	This means the time duration to the time of starting exposure from the time of fully pressing down the shutter button after having stabilized the focus operation due to the half pressing of the shutter, in the case of cameras that distinguish between the half pressing and the fully pressing. The term may be shortened to "shutter {time} lag" or "release {time} lag". ♦ Conditions etc.: It is recommended that the number of significant figures to be noted should be one or more for a time lag shorter than 10 millisecond, and two or more for 10 millisecond or longer time lag (round the value to the nearest decimal). ♦ Examples of notation: • Shutter time lag: 0.015 second • Release lag: 20ms	Any distinct method has not been defined for measurement in the form of final product (at the time point of publishing this guideline).
44	shooting time lag	In the case of cameras that distinguish between the half shutter and the full shutter, this item means the time duration from the time of pressing the shutter button fully in a breath, to the time of starting the exposure. In the case of cameras that do not distinguish between the half shutter and the full shutter, this item means the time duration from pressing the shutter button to starting the exposure . ♦ Conditions etc.: (1) In the case of reporting this item, also report the relevant conditions (measurement conditions may be left to the relevant company). (2) For cameras that can switch the focus mode between the automatic and the manual, the value for the focus mode given on factory shipping shall be reported preferably. (3) It is recommended that the number of significant figures to be noted should be one or more for less than 1 second time lag, and two or more for 1 second or longer time lag (round the value to the nearest decimal). ♦ Examples of notation: • Shooting time lag: 0.6 second (subject distance 3m, F2.8, for the subject conditions as specified by the relevant company) • Shooting time lag: 1 second (as specified by the relevant company condi	Any distinct measurement method has not been defined in the form of final product (at the time point of publishing these guidelines).
45	[burst {shooting}/continuous shooting] [speed/rate]	This means the number of shots per second the camera can take successively in continuous shooting (mode). ♦ Conditions etc.: (1) The starting point of time measurement is set to the time of starting exposure of the first shot. (2) If the interval of shooting is irregular, then take an average value. If the interval between the first and the second shot is different from the other intervals, it is desirable to describe that purport. (3) If the continuous shooting speed obviously fluctuates because the buffer becomes full, or due to other reasons, "report of only the value until the buffer becomes full" or "distinctive report between the value until the buffer becomes full and the value after the buffer has become full" may be selected. For the starting point of time measurement at a continuous shooting speed after the buffer has become full, take the starting time of the first exposure after the time of buffer filled. (4) It is recommended that the number of significant figures to be noted should be one or more for the time of less than 1 sheet/second, and two or more for the time of 1 sheet/second or more (round the value to the nea (5) Note the value in relation to the number of shots at burst shooting mod (6) Describe the requirements for recording media, if any. (7) The conditions for the subject may be left to the supplier's discretion. ♦ Examples of notation: • 3 shots/second (continuous shots up to 7) • 3 shots/second (continuous shots up to 7) • 3.5 shots/second (for up to 7 shots); 1.5 shots/second (after the 8th shot	* In the case of reporting the same contents by the shooting interval (time) at the continuous shooting (mode), designate an item name different from the continuous shooting speed (e.g., continuous shooting interval etc.). * The conditions of Paragraphs (2) and (3) are stipulated for the purpose of clarification because: • Some cameras exist in which the interval between the first shot and the second shot is greater than the interval in the latter shots. • It is desirable to distinctively report the value before the buffer becomes full and the value after that time because it is general that the interval becomes longer after the buffer has become full.
46	number of [recordable pictures/shots] at [burst {shooting}/continuous shooting] mode	This means the number of shots that the camera can continuously take at a approximately constant speed in continuous shooting (mode). ♦ Conditions etc.: (1) It is recommended that the value shall be noted in relation to the burst shooting speed (item 45). (2) The condition of the subject may be left to the relevant company. ♦ Examples of notation: • 7 shots (3.5 shots/second) • 100 shots • Up to the capacity of memory medium	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
47	shooting interval	This means the time interval from the time of one release to the time of next available release in single shooting mode that takes picture one by one, where the time interval is defined as the time duration from the end of an exposure to the start of nest exposure. ♦ Conditions etc.: (1) Between one shot and the next shot, there must be a moment in which the finger completely leaves the shutter release button. (2) The conditions of subject shall be left to the relevant company. (3) It is recommended that the number of significant figures to be noted should be one or more for the time less than 1 second, and two or more for the time of 1 second or longer (round the value to the nearest decimal). ♦ Examples of notation: • 0.5 second (using the subject specified by the relevant company) • 1.2 second • 2 second	If the shutter speed is short enough, the interval from the time of starting exposure to the time of starting next exposure will have roughly the same value.
48	[zoom ratio/magnification] of playback mode	This means the ratio of similitude between the enlarged image and the not enlarged image on the picture display of playback mode. ♦ Conditions etc.: If the enlarged magnification is different between the horizontal and vertical directions, report the ratio of length of diagonal direction. ♦ Examples of notation: 4 times	
49	battery [consumption/life]	Comply with CIPA DC-002.	
50	weight	This means the total weight when shooting or the body weight. ♦ Conditions etc.: (1) Comply with JCIS 27-1997. Until JCIS 27-1997 will be revised, however, exceptionally apply the contents in (2) and (3) below (*). (2) In the description, it shall be expressly noted which value is used, the total weight when shooting or the body weight. (3) In the table given in the provisions of Section 4 "Method of notation" of JCIS 27-1997, the provisions (minimum notation unit) in the upper line instead of the weight given in the lower line may be applied.	(*): JCIS 27-1997 has been in force for ten years since its establishment, with some of contents becoming unfit for the current situation, and therefore, this guideline has laid down new provisions (JCIS27-1997 is under discussion for reviewing).
51	dimensions	This means the outside dimensions (W mm x H mm x D mm). ♦ Conditions etc.: (1) Comply with JCIS 27-1997. Until JCIS 27-1997 will be revised, however, exceptionally apply the contents in (2) below (*). (2) In the table given in the provisions of Section 4 "Method of notation" of JCIS 27-1997, the provisions (minimum notation unit) in the upper line instead of the dimensions given in the lower line may be applied.	(*): JCIS 27-1997 has been in force for ten years since its establishment, with some of contents becoming unfit for the current situation, and therefore, this guideline has laid down new provisions (JCIS27-1997 is under discussion for reviewing).
52	volume	This means the actual volume when the camera is in the condition of being placed in containment or in the condition of usage, where the condition of being placed in containment refer to the condition in which the camera power supply is turned OFF. ♦ Conditions etc.: (1) Note in the unit of cm^3. (2) It shall be expressly described which condition was adopted for the noted value, the condition of being placed in containment or the condition of usage. This provision does not apply unless the volume changes between in the condition of being placed in containment or in the condition of usage. (3) The number of significant figures to be noted shall be two or more (round the value to the nearest decimal). ♦ Examples of notation: $320cm^3$	
53	power source	This means the type of power supply such as applicable batteries and external DC input. ♦ Conditions etc.: (1) Report the type of the battery, if camera uses the battery, and the type of external power supply if such is used. (2) Notation for the battery type may observe the custom. (3) Notation for the external power supply may be left to the relevant supplier's discretion. ♦ Examples of notation: • Lithium ion battery (3.7V, supplied with the camera) • Two AA alkaline batteries (two cells) • Dedicated AC adaptor (optional)	

No.	Items	Specifications (Definitions) and Guideline for Notation	**Remarks** (measurement method / tolerance / reasons for no stipulation, etc.)
54	interface	Describe the available external interface. ♦ Conditions etc.: (1) Expression may observe the custom. ♦ Examples of notation: • DC input (special terminal) • AV output • Dedicated I/O terminal • USB • Hi-Speed USB	
55	operating [temperature/temperature range]	This means the range of temperature that guarantees the camera operation. ♦ Conditions etc.: (1) The details of guaranteed operation may be left to the relevant company. ♦ Examples of notation: 0 to 40ºC	
56	operating humidity	This means the range of humidity that guarantees the camera operation. ♦ Conditions etc.: (1) The details of guaranteed operation may be left to the relevant company. ♦ Examples of notation: 10 to 90%	
57	Applicable laws and regulations	This guideline does not cover this item.	This guideline does not cover this item because it relates to the compliance with laws, ordinances and other regulations.

Commentary

This commentary does not constitute any part of this guideline; only provides additional explanation about some of the matters that are contained in the body text and its relevant matters.

1. Application to other products

Although this guideline is intended to be applied to the consumer digital still cameras, there is no reason to hinder people from applying them to products with similar notations to those used with digital still cameras.

2. Deliberation committee members

This guideline has been established through the following process: The original draft was deliberated by DSC Specification Standards ad-hoc WG of Technical Working Group of Standardization Committee, and then the deliberated draft was further discussed by DSC Specification Sub-Working Group of Technical Working Group of Standardization Committee. In addition, the opinions from Catalogs Sub-Working Group of Technical Working Group of Standardization Committee were adopted as valuable input in the course of discussing notations and related matters in this guideline. The following section lists the members who worked for the discussion and establishment of this guideline.

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