



Designation: E2765 – 11

Standard Practice for Use of Image Capture and Storage Technology in Forensic Document Examination¹

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1. Scope

1.1 This practice provides procedures to be used by forensic document examiners (Guide E444) using image capture and storage technology.

1.2 These procedures are applicable whether the use of the image capture technology involves an item(s) associated with a matter under investigation (questioned or known items), or is for reference.

1.3 These procedures include evaluation of the sufficiency of the available imaging capture and storage technologies.

1.4 Procedures are also outlined for image archiving.

1.5 The particular methods employed in a given case depend upon the nature of the item, or the question at hand, or both.

1.6 This practice might not cover all aspects of the use of image capture and storage technology involving unusual or uncommon items.

1.7 This practice cannot replace the requisite knowledge, skills, or abilities acquired through appropriate education, training (Guide E2388), and experience and should be used in conjunction with sound professional judgment.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This practice is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.90 on Executive.
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2. Referenced Documents

2.1 ASTM Standards:²

E312 Practice for Description and Selection of Conditions for Photographing Specimens Using Analog (Film) Cameras and Digital Still Cameras (DSC)

E444 Guide for Scope of Work of Forensic Document Examiners

E1422 Guide for Test Methods for Forensic Writing Ink Comparison

E1732 Terminology Relating to Forensic Science

E2195 Terminology Relating to the Examination of Questioned Documents

E2388 Guide for Minimum Training Requirements for Forensic Document Examiners

2.2 SWGIT Documents:³

Section 1 Overview of SWGIT and the Use of Imaging Technology in the Criminal Justice System

Section 2 Considerations for Managers Migrating to Digital Imaging Technology

Section 3 Guidelines for Field Applications of Imaging Technologies in the Criminal Justice System

Section 5 Recommendations and Guidelines for the Use of Digital Image Processing in the Criminal Justice System

Section 8 General Guidelines for Capturing Latent Impressions Using a Digital Camera

Section 11 Best Practices for Documenting Image Enhancement

Section 13 Best Practices for Maintaining the Integrity of Digital Images and Digital Video

Section 15 Best Practices for Archiving Digital and Multimedia Evidence (DME) in the Criminal Justice System

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Information regarding Scientific Working Group on Imaging Technology (SWGIT) is available from International Association for Identification (IAI), 2535 Pilot Knob Road, Suite 117, Mendota Heights, MN 55120-1120, <http://www.theiai.org>.

2.3 SWGIT/SWGDE Documents:⁴

SWGIT/SWGDE Digital and Multimedia Evidence Glossary

3. Terminology

3.1 For definitions of terms in this Practice, refer to Terminology **E1732** and Terminology **E2195**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *archive copy*, *n*—a copy of data placed on media suitable for long-term storage, from which subsequent working copies can be produced. **SWGIT/SWGDE**

3.2.2 *archive image*, *n*—any image placed on media that is suitable for long-term storage. **SWGIT/SWGDE**

3.2.3 *archiving*, *n*—the process of storing data in a manner suitable for long-term availability and retrieval. **SWGIT/SWGDE**

3.2.4 *capture*, *n*—the process of recording data, such as an image, video sequence, or audio stream. **SWGIT/SWGDE**

3.2.5 *capture device*, *n*—a device used in the recording of data. **SWGIT/SWGDE**

3.2.6 *CD/DVD (compact disc/digital versatile disc)*, *n*—optical disk technology formats designed to function as digital storage media. **SWGIT/SWGDE**

3.2.7 *compression*, *n*—the process of reducing the size of a data file. (See also **lossless compression** and **lossy compression**.) **SWGIT/SWGDE**

3.2.8 *copy*, *n*—an accurate reproduction of information. **SWGIT/SWGDE**

3.2.9 *data*, *n*—information in analog or digital form that can be transmitted, stored, or acted upon. **SWGIT/SWGDE**

3.2.10 *digital image*, *n*—an image that is represented by discrete numerical values organized in a two-dimensional array; when viewed on a monitor, projected image or printed on paper, it appears similar to a photograph. **SWGIT/SWGDE**

3.2.11 *image*, *n*—a visually observable counterpart of an object produced by means of imaging technology.

3.2.12 *image*, *v*—to produce a digital, or analog, observable counterpart of an object by means of imaging technology.

3.2.13 *image averaging*, *n*—the process of averaging similar images, such as sequential video frames, to reduce noise in stationary scenes. **SWGIT/SWGDE**

3.2.14 *image enhancement*, *n*—any process intended to improve the visual appearance of an image or specific features within an image. **SWGIT/SWGDE**

3.2.15 *image output*, *n*—the means by which an image is presented for examination or observation. **SWGIT/SWGDE**

3.2.16 *image processing*, *n*—any activity that transforms an input image into an output image. **SWGIT/SWGDE**

3.2.17 *image processing log*, *n*—a record of the steps used in the processing of an image. **SWGIT/SWGDE**

3.2.18 *imaging technology*, *n*—any system (or method) used to capture, store, process, analyze, transmit, or produce an image. Such systems include film, electronic sensors, cameras, video devices, scanners, printers, computers, etc. **SWGIT/SWGDE**

3.2.19 *intermediate storage*, *n*—any media, or device, on which data is temporarily stored for transfer to permanent or archival storage. **SWGIT/SWGDE**

3.2.20 *interpolation*, *n*—a method of image processing whereby one pixel, block, or frame is created, used or stored, based on the differences between the previous and subsequent pixel, block, or frame of information. This is often done to increase the apparent clarity of an image. **SWGIT/SWGDE**

3.2.21 *line pairs per millimetre (LP/mm)*, *n*—a measure of the spatial resolution of an image conversion device. **SWGIT/SWGDE**

3.2.22 *lossless compression*, *n*—compression in which no data is lost and all data can be retrieved in its original form. **SWGIT/SWGDE**

3.2.23 *lossy compression*, *n*—compression in which data is lost and cannot be retrieved in its original form. **SWGIT/SWGDE**

3.2.24 *media*, *n*—objects on which data can be stored. **SWGIT/SWGDE**

3.2.25 *metadata*, *n*—data, frequently embedded within a file, that describes a file or directory, and which can include the locations where the content is stored, dates and times, application specific information, and permissions. **SWGIT/SWGDE**

3.2.26 *native file format*, *n*—the original form of a file. **SWGIT/SWGDE**

3.2.26.1 *Discussion*—A file created with one application can often be read by others, but a file's native format remains the format it was given by the application that created it.

3.2.27 *noise*, *n*—variations or disturbances in brightness or color information in an image that do not arise from the scene. **SWGIT/SWGDE**

3.2.27.1 *Discussion*—Sources of noise include film grain, electronic variations in the input device sensor and circuitry, and stray electromagnetic fields in the signal pathway. It frequently refers to visible artifacts in an image.

3.2.28 *original image*, *n*—an accurate and complete replica of the primary image, irrespective of media; for film and analog video, the primary image is the original image. **SWGIT/SWGDE**

3.2.29 *primary image*, *n*—refers to the first instance in which an image is recorded onto any media that is a separate, identifiable object (for example, a digital image recorded on flash media). **SWGIT/SWGDE**

3.2.30 *processed image*, *n*—any image that has undergone enhancement, restoration or other operation. **SWGIT/SWGDE**

⁴ Information regarding Scientific Working Group on Imaging Technology/Scientific Working Group on Digital Evidence (SWGIT/SWGDE) is available from International Association for Identification (IAI), 2535 Pilot Knob Road, Suite 117, Mendota Heights, MN 55120-1120, <http://www.theiai.org>.