

General Guidelines for the Capture of Latent Impressions Using a Digital Camera

Purpose: To document latent print evidence in the field by qualified personnel utilizing a digital camera as a capture device.

The following recommendations are made in accordance with current National Institute of Standards and Technology (NIST) guidelines specifying 1000 pixels per inch (ppi) at 1:1 as the minimum resolution.

Equipment:

It is recommended that a Professional Digital Camera Kit consist of the following:

- Professional digital camera
The digital camera should be capable of interchangeable lenses, manual over-ride for exposure and focus, off camera flash, remote shutter release and tripod mount.
- Macro lenses capable of 1:1
- Dedicated electronic flash designed for digital camera, capable of off camera operation
- Dedicated electronic flash cable to permit off camera operation
- Remote shutter release
- Tripod capable of various angles and positions
- Artificial light sources (flood lights, flashlight, etc)
- Digital storage media including additional media as needed
- Portable computer and appropriate software for downloading and viewing of images at the scene
- Appropriate cable connections (eg, USB, Firewire, parallel) and/or PCMCIA capability
- Scaling devices graduated in millimeters
- Photographic log

The camera/capture devices listed in the following professional camera comparison chart will meet the required 1000 ppi standard. However, this is neither an endorsement nor a recommendation for the brand names/models of equipment listed. This is not an all-inclusive list; there are other cameras that will achieve this resolution.

PROFESSIONAL CAMERA COMPARISON CHART						
	Camera Format	Imager Size	Image Area relative to 35mm Film	Pixel Resolution	Total Pixel Resolution	Size of Capture Area at 1000 ppi ¹
# 01	Kodak DCS 420	13.8 x 9.2 mm	38%	1524 x 1012 Pixels	1,542,288 Pixels	37 x 25 mm
# 02	Kodak DCS 315	13. X 9.2 mm	38%	1520 x 1012 Pixels	1,538,240 Pixels	37 x 25 mm
# 03	Kodak DCS 460/660	27.5 x 18.5 mm	75%	3072 x 2048 Pixels	6,291,456 Pixels	76 x 51 mm
# 04	35 mm film	36 x 24 mm	100%		Resolution ²	NA
# 05	120 film	57 x 57 mm	158%			NA
# 06	5 x 4 film (aka 4x5)	127 x 101 mm	352%			NA
# 07	Kodak DCS 520/620	22.5 x 15.1 mm	62%	1736 x 1160 Pixels	2,013,760 Pixels	43 x 28 mm
# 08	Nikon D 1	23.7 x 15.6 mm	66%	2000 x 1312 Pixels	2,624,000 Pixels	50 x 32 mm
# 09	Kodak DCS 330	18.1 x 13.5 mm	50%	2008 x 1504 Pixels	3,020,032 Pixels	50 x 37 mm
#10	Canon D30	22.7 x 15.1 mm	63%	2160 x 1440 Pixels	3,110,400 Pixels	54 x 36 mm

¹ 25.4 millimeters is equal to one inch. For the purpose of this document, 25.4mm is rounded to 25mm, therefore, 25mm equals one inch.

² Film resolving power or resolution is defined as lines per millimeter (lpmm).

General Requirements For Portable Computer

Some recommendations for computers dedicated for field use:

- Processor speed 400 MHZ or faster
- Color display
- System memory of 128MB or higher
- Minimum hard drive of 10GB
- Connectivity capability with camera
- Appropriate camera software for image file acquisition
- Appropriate software for file management
- Network capability
- AC power adapter/12VDC power adapter
- CD-R/W (for CD-R media)

Procedures:

Agency specific step-by-step instructions for the capture of latent images should be followed.

Note: Images from separate incidents should be clearly delineated through a change of storage media or through proper documentation.

Procedure (1): Lens calibration to achieve a Minimum of 1000 ppi

Note: The following should be completed prior to field use.

1. The pixel dimensions on the sensor will actually determine the camera to subject distance and therefore the area of maximum coverage for 1000 ppi.
2. To accomplish this, find the pixel resolution in the chart and that will tell you what the image size will be. If your camera is not listed on the chart, go to the manufacturers specification sheet and look for the pixel resolution size.

To determine the area in millimeters, divide the pixel resolution by 1000, then multiply by 25. (Twenty-five millimeters equals approximately one inch.) For example, 1524 X 1012 equals 37mm X 25mm (rounded to the lowest millimeter).

3. Make a template to the exact dimension of the area of coverage, (37mm X 25mm). Place template on a flat surface and fill image area in viewfinder with template and scale.
4. After achieving the camera to subject distance, mark lens with pencil, photograph template with scale and acquire image into computer.
5. Calibrate image with calibration software to actual size (1:1).
6. Print image and measure the scale to verify size. If this is correct, the lens is calibrated. If this is larger than actual size, move the camera closer to the template, re-focus and mark the lens. Repeat steps 4, 5 and 6. Once verified, this becomes the camera to subject maximum distance to provide 1000 ppi.
7. Once the above procedure is completed, its recommended to scribe a line on the side of the lens over the pencil mark and this is your known setting

to achieve the correct size (1000 ppi).

8. The camera must be physically moved in and out to focus image (**to assure resolution do not change lens focus**).

Procedure (2): Camera Setup for Latent Impression Photography

A typical standard operating procedure includes the following elements. These techniques apply for both field and laboratory settings.

1. Locate visible impressions to be captured
2. Capture overall view of impression area without a scale with appropriate lighting
3. Capture overall view of impression area with scale and appropriate lighting
4. Mount camera on tripod with camera at 90-degree angle to the impression. Do not use a magnetic level (Avoid contact or proximity of magnetic fields with storage media and camera as these fields may erase stored images, erase stored data, and interfere with image capture).
5. Light visible impression appropriately
6. Place scale/identification tag adjacent to impression without obscuring detail.
 - a. Field Tag information should contain at a minimum the following:
 - Case/File number
 - Date
 - Initials
 - Source
 - b. Laboratory Identification Tag:
 - Case/File Number
 - Date
 - Initials

- Source
- Process Used

7. Fill image area in viewfinder with impression and scale utilizing lens calibrated with camera in use.
8. Take light meter readings and adjust camera settings to capture image
9. Capture impression using correct exposure as indicated by the light meter. If necessary, capture additional images of the impression by bracketing exposures up one f-stop and down one f-stop.
10. Visually verify images.
11. If images are unacceptable, re-photograph.
12. Repeat steps 7 through 11 for each lighting position used for that impression
13. After the evidence is processed for impressions, follow procedures 5 through 11 as appropriate for all latent prints developed
14. Prepare photographic log or worksheet per agency policy
15. When utilizing more than one storage media, uniquely identify each device.

Procedure (3): Utilization of Portable Computer

Acquiring File/Images to Computer in Field Operations

1. Connect camera or removable media to computer according to manufacturer's specifications.
2. Create and name a file folder on the computer's hard drive to receive original image files. Your camera/software may require unique file folder names for each download. Care should be taken **not to overwrite** existing image files from previously downloaded media. Some cameras reset their file counters whenever media is changed.
3. Prepare subdirectories for receipt of downloaded images from camera/media. Create and name a subdirectory, using unique naming convention, in sequential order.
4. Copy all original files to appropriate subdirectory
5. Verify that all images have been copied into the correct subdirectory
6. Set file permissions to preclude accidental deletion of files.
7. If appropriate, erase removable media for re-use. Agency-specific SOPs should dictate whether re-utilization of storage media is acceptable.