

ePhEx/CMID Examination of Trash Marks

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ePhEx/CMID Examination of Trash Marks

1 INTRODUCTION

This procedure is intended to be utilized by trained personnel to ensure consistency and transparency of methods employed during the examination of documentary evidence containing **Redacted** trash marks received in the Questioned Documents Unit (QDU).

2 SCOPE

These procedures will be used by a forensic document examiner when conducting graphic arts examinations. These procedures are designed to be used in collaboration with the technical procedure [DOC-207 Graphic Arts, Photocopier, and Printer Examinations](#) and includes the method for utilizing the ePhEx and CMID macros to analyze trash marks.

3 EQUIPMENT

- Document scanner
- Camera with the following functionality:
 - Capture image at approximately 600 ppi resolution with 16-bit depth
 - Manual control of exposure and focus
 - Macro lens (to ensure entire page can be captured without distortion from curvature along the edges)
- Steady state lighting
- Vacuum table, if available
- Dark colored drop cloth
- Ruler
- Computer with the following software:
 - Operating system of Windows 7 through 11
 - Microsoft Excel version 2013 or newer
 - Adobe Photoshop CS5/6 or CC2017-2021
 - ePhEx macro
 - CMID macro

4 PROCEDURE

The following procedures are designed to guide use of the ePhEx and CMID macros to conduct additional examinations of trash marks as identified in the technical procedure [DOC-207 Graphic Arts, Photocopier, and Printer Examinations](#).

- Section 4.4 A of the [DOC-207 Graphic Arts, Photocopier, and Printer Examinations](#) procedure must be conducted prior to beginning the procedures listed below.
- Once the procedures below are completed, as applicable, the examiner should return to the [DOC-207 Graphic Arts, Photocopier, and Printer Examinations](#) technical procedure for further analysis and providing any conclusions regarding examinations conducted and observations made.

4.1 Digitizing the Evidence

Physical evidence may be digitized by scanning or photography. Either method may be used when evidence contains text and/or graphics. However, photography is recommended when a comparison involves exemplars without text or graphics.

4.1.1 Scanning Parameters

- A. Scan digital evidence using a ruler with a minimum resolution of 400 ppi
- B. Save the images captured in the case file.

4.1.2 Photography Parameters

- A. Label the physical evidence on the back.
- B. Photograph the evidence at approximately 600 ppi resolution, slightly underexposed, and with a 16-bit depth.
 - o Manual focus and a macro lens should be used to ensure the entire page is captured without distortion from curvature along the edges.
 - o Use of a steady state lighting source (rather than flash), a vacuum table, and dark colored drop cloth are recommended.
 - o At least one image should be captured to include a ruler to verify resolution.
 - o Camera settings should not be changed within a single photography session.
- C. Save the images captured in the case file.

4.2 Preparing the Images for Macro Use

This section should be completed regardless of the method selection in Section 4.1 to digitize the evidence.

- A. Create a copy of the digital images captured in Section [4.1 Digitizing the Evidence](#).
- B. Ensure images are properly calibrated
- C. Crop and straighten the images to remove the background using Adobe Photoshop.
 - o The examiner should ensure that the images are in alignment for comparison prior to moving to the next step.
- D. Select the appropriate threshold value.
 - o The appropriate threshold value is selected when it results in a binary image where the trash marks are black and the paper is white.

4.3 Using the ePhEx Macro to Document Trash Marks

The resolution of the image should be noted prior to proceeding with either of the following pathways. The “questioned document pathway” should be utilized when the document contains text or graphics, and the “known document pathway” is designed for exemplars that do not contain text or graphics.

4.3.1 Using the “questioned document pathway” within the ePhEx Macro

Redacted

- B. Run the ePhEx macro selecting the Q-Document pathway.
- C. Enter the image resolution previously noted.

D. Review the ePhEx results

Redacted

4.3.2 Using the “known document pathway” within the ePhEx Macro

- A. Run the ePhEx macro selecting the K-Document pathway.
- B. Enter the image resolution and threshold value (section 4.2 D) previously recorded.
Redacted

4.4 Inter-comparison of Documents

4.4.1 Using the CMID Macro for Inter-comparison

Redacted

- A. Copy the ePhEx results workbook files for each Q and/or K set to be compared into a single folder.
- B. Run the CMID macro.
- C. Verify the desired lookout distance.
- D. Review the CMID results.

4.4.2 Using the Open Comparison Images Process

- A. Using the ePhEx results workbook
Redacted
- B. Click the “Open Comparison Images” button.
- C. Provide the image resolution
 - o Note: the image resolution should be the same for all images selected.
- D. Review the results provided.

4.5 Records

The case records will include any of the following items that were observed during the examination process and support the findings or conclusions rendered:

- Image files
- Overlays
- Threshold values used
- ePhEx results,
Redacted
- CMID results
- Open Comparison Images results

5 LIMITATIONS

The following factors could affect the examinations process and/or the results rendered:

- If the ePhEx user-defined threshold value is too high or too low, this may result in false positives or false negatives, respectively. Automated results should be compared to physical evidence and verified by the examiner manually.

Redacted

6 SAFETY

Standard precautions should be followed for the handling of chemical and biological materials. Chemical and biological materials that are hazardous or potentially hazardous will be maintained and examined in specifically designated areas within QDU space. QDU personnel may refer to the [FBI Laboratory Safety Manual](#) for additional guidance.

7 REFERENCES

[DOC-207 Graphic Arts, Photocopier, and Printer Examinations](#)

8 REVISION HISTORY

Revision	Issued	Changes
00	10/02/2023	Original document issued