

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### ULTRAVIOLET (UVA)-INDUCED VISIBLE FLUORESCENCE (STANDARD CAMERA)



## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Capture

#### Preliminary

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Ultraviolet-induced visible fluorescence is used to differentiate and characterize materials. The technique involves excitation of materials with ultraviolet radiation in order to induce fluorescence in visible wavelengths. **Always wear UV goggles when the UV lights are on.**

#### Set Up

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The supplies used for this setup are stored in the studio cabinet.

1. Mount either the 60 mm lens or 24-70 mm lens on the D810 camera body.
2. The **Kodak 2E** and **PECA 918** filters are used for UV-induced visible fluorescence photography with the standard camera. The two filters have been combined into a single filter holder (fig.10.01).
3. 24-70 mm lens: Very carefully, screw the filter holder onto the end of the lens.  
60 mm lens: Very carefully, screw the 62-77 mm step-up ring, followed by the filter holder, onto the end of the lens.
4. Set the focus-mode switch on the camera lens to *M* for manual focus (fig.10.02).
5. Plug in the UV lamps. **It is important to plug in both cords (two for each lamp) for at least 20 seconds before switching on the lamps.** Neglecting to do this will seriously shorten the life of the tubes. Turn on the lamps using the white toggle switch (fig 10.03) located at the short end of each unit closest to the copystand wall. Let the lamps warm up for at least 5 minutes before capture.
6. Adjust the height of the lamp stands so the bottom of the collar is at 25". Position the lamps equidistant and as close to the copystand as possible (fig. 10.04). Try to achieve even illumination across the area to be photographed. Do not change the angle of the lamps.

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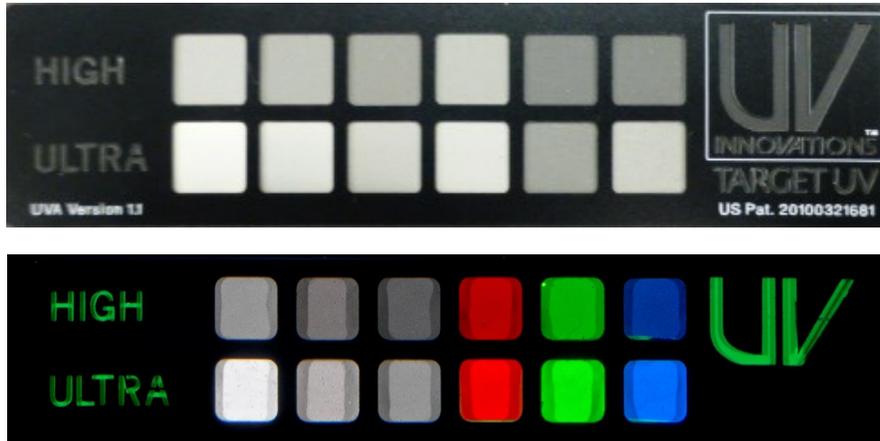


Figure 10.05

2.18.4106.001 Before treatment  
11/20/17 UVA-induced visible fluorescence

Figure 10.06

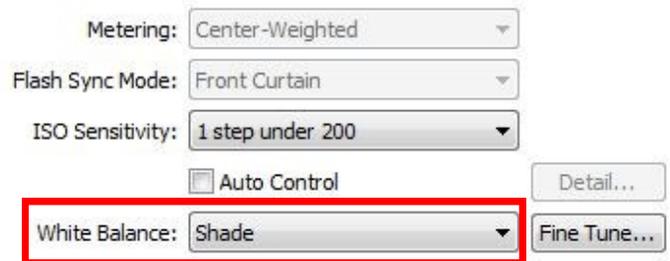


Figure 10.07

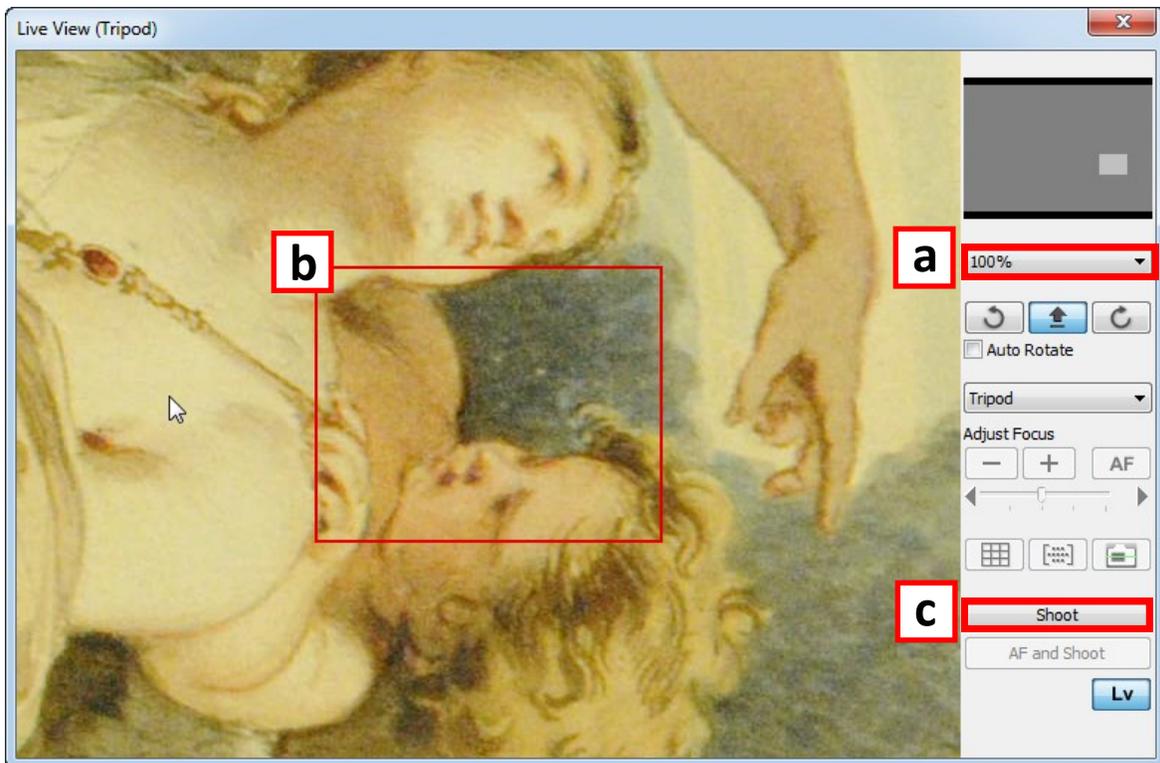


Figure 10.08

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Set Up, continued

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7. With the UV lamps warmed up and the overhead light off, position the UV target (fig 10.05) adjacent to your object. Compare the intensity levels on the target (Low, Medium, High, or Ultra) with the overall fluorescence of the object and select an intensity with a similar brightness level. If you are still unsure, consult the detailed guide to matching fluorescent targets with fluorescent materials stored in the studio cabinet.
8. Include a paper identification label using white letters on a black background in order to reduce flair from paper fluorescence (fig. 10.06).

### Image Capture

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1. In **Camera Control Pro** under the *Exposure 1* tab, select the following:
  - Exposure Mode: Aperture Priority
  - Aperture: f/8 (flat objects) or f/11 (3D objects)
  - Exposure Comp.: 0
2. Under the *Exposure 2* tab, set the white balance to **Shade** (fig. 10.07).
3. Settings under the *Storage* and *Image Processing* tabs are the same as with normal illumination (Section 2).
4. Open *Live View*. Position your object and label in the image frame. Place the UV target adjacent to the object so that the gray patches of the intensity level chosen are closest to the object.
5. Set the magnification ratio to 100% (fig 10.08a). With the overhead light on, use the focusing ring on the camera lens to manually focus. The focus frame will remain red (fig. 10.08b).
6. With the overhead light off, place the cursor on the *Shoot* button and cover the monitor with black fabric. Be careful not to move the mouse and left click *Shoot* (fig. 10.08c).

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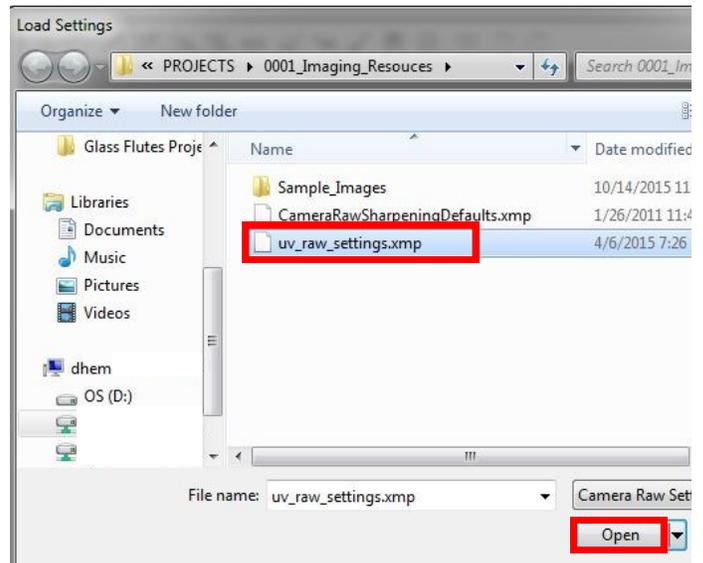
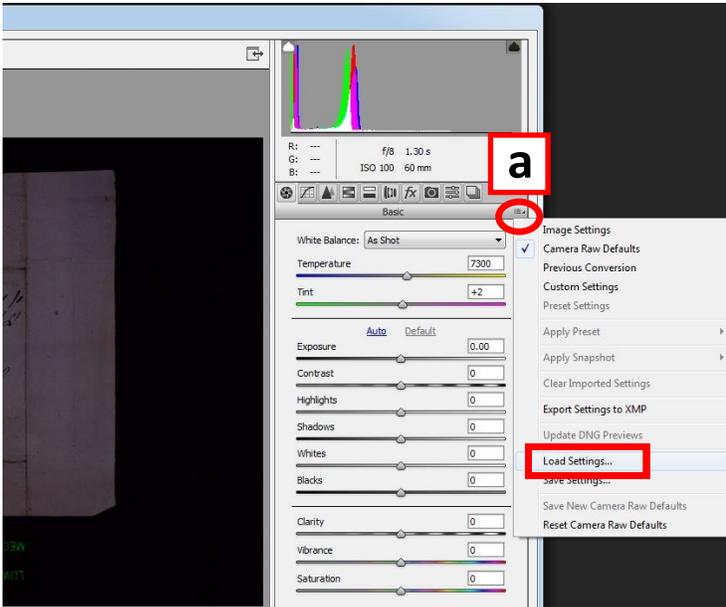


Figure 10.09

Figure 10.10

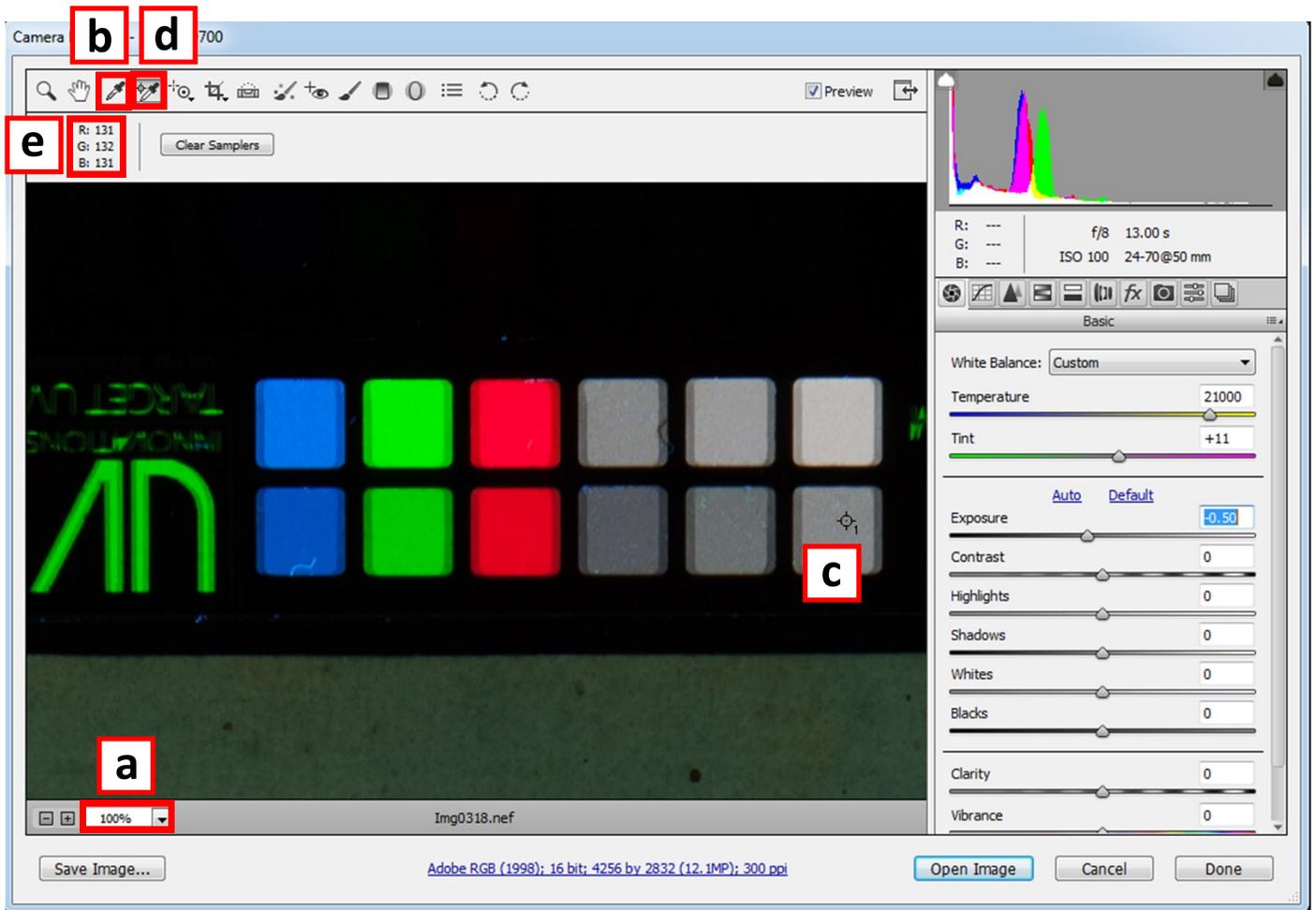


Fig 10.11

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Preview Images

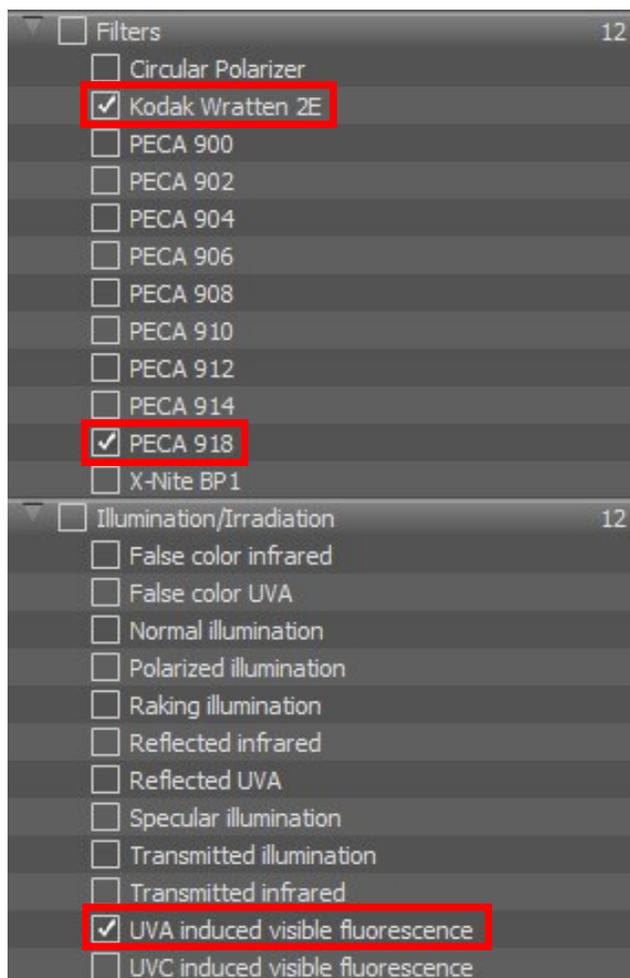
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1. In **Bridge**, open the image in **Camera Raw**.
2. Left click on the *Camera Raw Settings Menu* in the upper right corner of the **Camera Raw** window (fig. 10.09a). Select *Load Settings*.
3. Navigate to *N: > Projects > 0001\_Imaging\_Resources* and select *uv\_raw\_settings.xmp* (fig. 10.10). Click *Open* to apply UV settings.
4. To white balance, zoom to 100% (fig. 10.11a). Select the *White Balance Tool* (fig. 10.11b) and click on the lightest gray patch for the intensity level chosen (fig. 10.11c). Be careful to click on the gray particles and not the green particles in the gray patch.
5. To check exposure, select the *Color Sampler Tool* (fig. 10.11d). Click on the lightest gray patch for the intensity level chosen (fig. 10.11c). Be careful to click on the gray particles and not the green particles in the gray patch. The RGB values should be 130 +/-3 (fig. 10.11e).
6. If RGB values are outside of 130 +/-3, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reapply UV settings, white balance, and check exposure again in **Camera Raw**.
7. Click *Done* in **Camera Raw** to accept changes.

**NOTE:** It is not uncommon for paper objects to display a weak fluorescence. If the area of interest on your object appears too dark on the monitor when the lightest gray patch is at 130, move the *Color Sampler Tool* to the second or middle gray patch and target 130 again. Note which patch was used to replicate for during and after treatment capture.

**NOTE:** The object as displayed on the monitor may appear slightly blue/green overall as compared to what you observe directly on the copystand. This variation derives from the difference between subjective human perception and the objective responsivity of the camera sensor.

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)



**Fig 10.12**

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### Finish

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Finish the photography session as done with normal illumination (Section 2). In addition, turn off and unplug the UV lamps, wrapping cords around the fixture at the end of the lamp. Reposition the lights at the 66" mark on the floor, with the top of the collar at 52". Set camera lens back to M/A (fig. 10.02). Remove the filters from the lens and replace the lens cap. Return the UV filters, target, black fabric, and goggles to the studio cabinet.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Select *Kodak Wratten 2E* and *PECA 918* under *Filters* and *UVA induced visible fluorescence* under *Illumination/Irradiation* (fig.10.12).

### Image Processing

#### Adjust Image Files

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1. In **Bridge**, open the image in **Camera Raw**.
2. Adjust *Exposure* to obtain RGB values of 130 in the gray patch targeted (fig. 10.11c-e).
3. Sharpening, straightening, cropping, and confirming workflow options are the same as with normal illumination images (Section 4).
4. Click *Done* to save your adjustments.

#### Rename and Save

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Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.