Section 18—Reflected Ultraviolet (Modified Camera)

Digital Imaging Workflow for Treatment Documentation
Conservation Division, Preservation Directorate, Library of Congress

REFLECTED ULTRAVIOLET (MODIFIED CAMERA)

This mode can be useful for enhancing the visibility of surface coatings and adhesives. It can also be a useful tool for documenting surface abrasions, accretions, and retouching. Materials that visibly fluoresce when induced by UVA will appear dark in reflected ultraviolet photography. In cases where fluorescence is weak, reflected UV may be helpful.
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Figure 18.01

Peca #900 (18A) Filter for IR-UV Cameras 52mm
For cleaning use Formula MC or LensBrite optical cleaner and LCT-PG lens cleaning tissue.
www.ir-uv.com

Figure 18.02

Figure 18.03
Preliminary

If not done already, capture a visible illumination image with the modified camera following instructions in Section 14. Wear UV goggles when the UV lights are on.

Set Up

1. Use the Nikon D700 modified camera and the CoastalOpt lens.
2. The CoastalOpt lens MUST be set at the minimum aperture setting of f/45 to utilize the electronic aperture function (otherwise the camera will display “EE”).
3. The PECA 900 and X-Nite BP1 filters are used for reflected ultraviolet photography with the modified camera (fig 18.01). The filters are stored in the studio cabinet. Very carefully, screw on both filters to the end of the camera lens. The order the filters are screwed on does not matter.
4. 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 lamps. Neglecting to do this will seriously shorten the life of the tubes. Turn on the lamps using the white toggle switch (fig 18.02) 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.
5. 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. 18.03). Try to achieve even illumination across the area to be photographed. Do not change the angle of the lamps.
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Figure 18.04

Figure 18.05

Figure 18.06
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Image Capture

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) - select same as used in visible
   - Exposure Comp.: 0
2. Under the Exposure 2 tab, set the white balance to Shade (fig. 18.04).
3. Settings under the Storage and Image Processing tabs are the same as with visible illumination with the modified camera (Section 14).
4. Open Live View. Position your object in the image frame. Place the color target adjacent to the object so that the gray patches are positioned closest to the object and the lightest gray patch is equidistant from each light source. (fig. 15.03).
5. Use the same focus as set manually for visible illumination with the modified camera (Section 14). The focus frame will remain red due to manual focusing.
6. Click Shoot (fig. 17.07b). The overhead light may remain on.

Preview Images

1. In Bridge, open the image in Camera Raw.
2. Set the Saturation to -100 (fig. 18.05).
3. Select the Color Sampler Tool (fig. 18.06a) and click on the lightest gray patch on the color target (fig. 18.06b). The RGB values should be 120 +/-5 (fig. 18.06c).
4. If RGB values are outside 120 +/-5, adjust Exposure Comp. in Exposure 1 tab of Camera Control Pro and reshoot. Reevaluate in Camera Raw.
5. Click Done in Camera Raw to accept changes.
Figure 18.07
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### Finish

If continuing to another section, remove the PECA 900 and X-Nite BP1 filters before proceeding.

When finished with the session, return the camera, USB cord, filters, goggles, and target to the studio cabinet; turn off and unplug the UV lamps, wrapping cords around fixture at the end of the lamp; reposition the light at the 66” mark on the floor, with the top of collar at 52”.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 900* and *X-Nite BP1* under Filters and *Reflected UVA* under Illumination/Irradiation (fig. 18.07).

### Image Processing

#### Adjust Image Files

1. Open the image in **Camera Raw** from **Adobe Bridge**.
2. Ensure Saturation is set at –100 (fig 18.05).
3. Adjust exposure so that the RGB values of the lightest gray patch on the target are 120.
4. Sharpening, straightening and cropping procedures are the same as with normal illumination images captured with the standard camera (Section 4). White balance does not need to be adjusted.
5. Click *Done* to save your adjustments.

#### Rename and Save

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.
Figure 18.08
Post-processing of reflected ultraviolet images is required.

**Convert to Grayscale**

1. Open the reflected ultraviolet .tif file in **Photoshop**.
2. Click **Image > Mode > Grayscale** (fig. 18.08a).
3. Click **Discard** (fig. 18.08b).
4. Click **File > Save**. Any derivative file should be made from the .tif file. It is unnecessary to adjust the .dng file.
5. Close the file.