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 visably fluoresce when induced by UVA will appear dark in reflected ultraviolet photography. In cases where fluorescence is weak, reflected UV may be helpful.

Visible illumination

Reflected ultraviolet

Figure 18.01

Figure 18.02

Figure 18.03

Section 18—Reflected Ultraviolet (Modified Camera)

Capture

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 $_{F}$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.

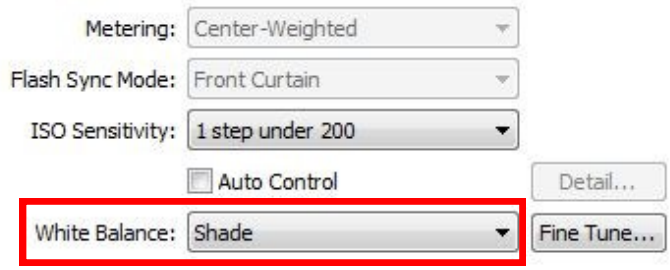

Figure 18.04

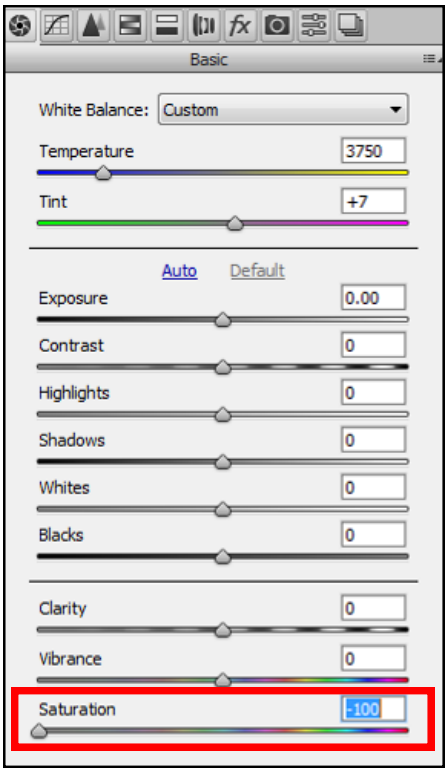

Figure 18.05

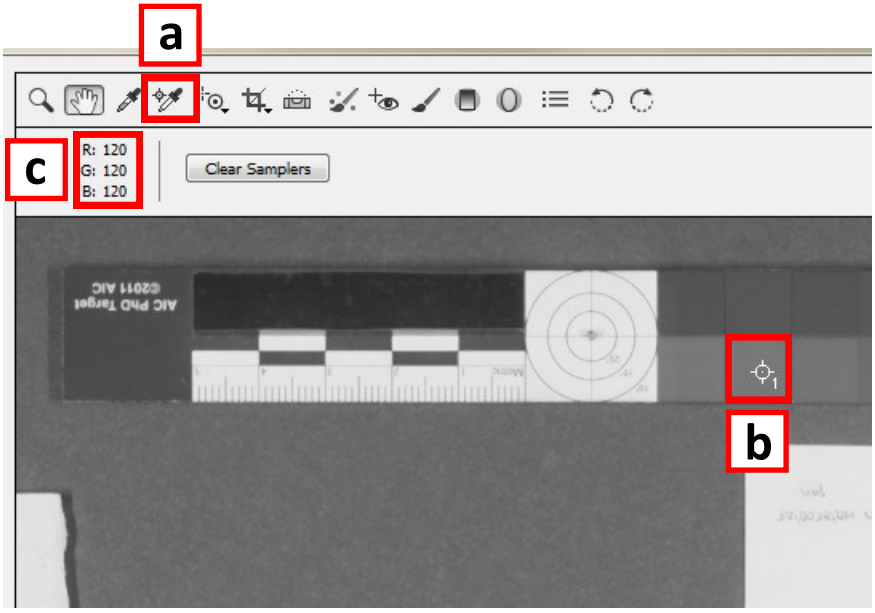

Figure 18.06

Section 18—Reflected Ultraviolet (Modified Camera)

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.

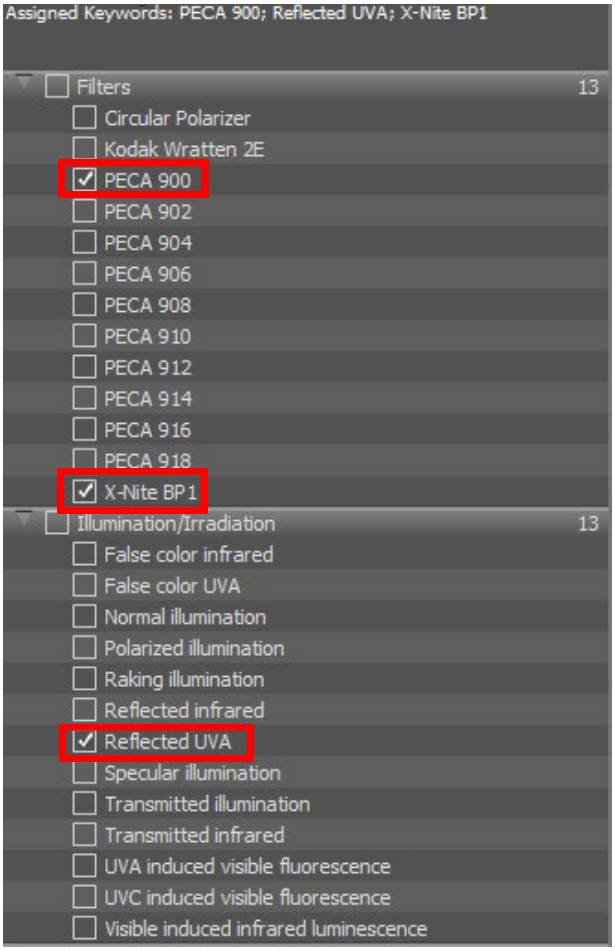
Assigned Keywords: PECA 900; Reflected UVA; X-Nite BP1
Filters 13
Circular Polarizer
Kodak Wratten 2E
PECA 900
PECA 902
PECA 904
PECA 906
PECA 908
PECA 910
PECA 912
PECA 914
PECA 916
PECA 918
X-Nite BP1
Illumination/Irradiation 13
False color infrared
False color UVA
Normal illumination
Polarized illumination
Raking illumination
Reflected infrared
Reflected UVA
Specular illumination
Transmitted illumination
Transmitted infrared
UVA induced visible fluorescence
UVC induced visible fluorescence
Visible induced infrared luminescence

Figure 18.07

Section 18—Reflected Ultraviolet (Modified Camera)

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.

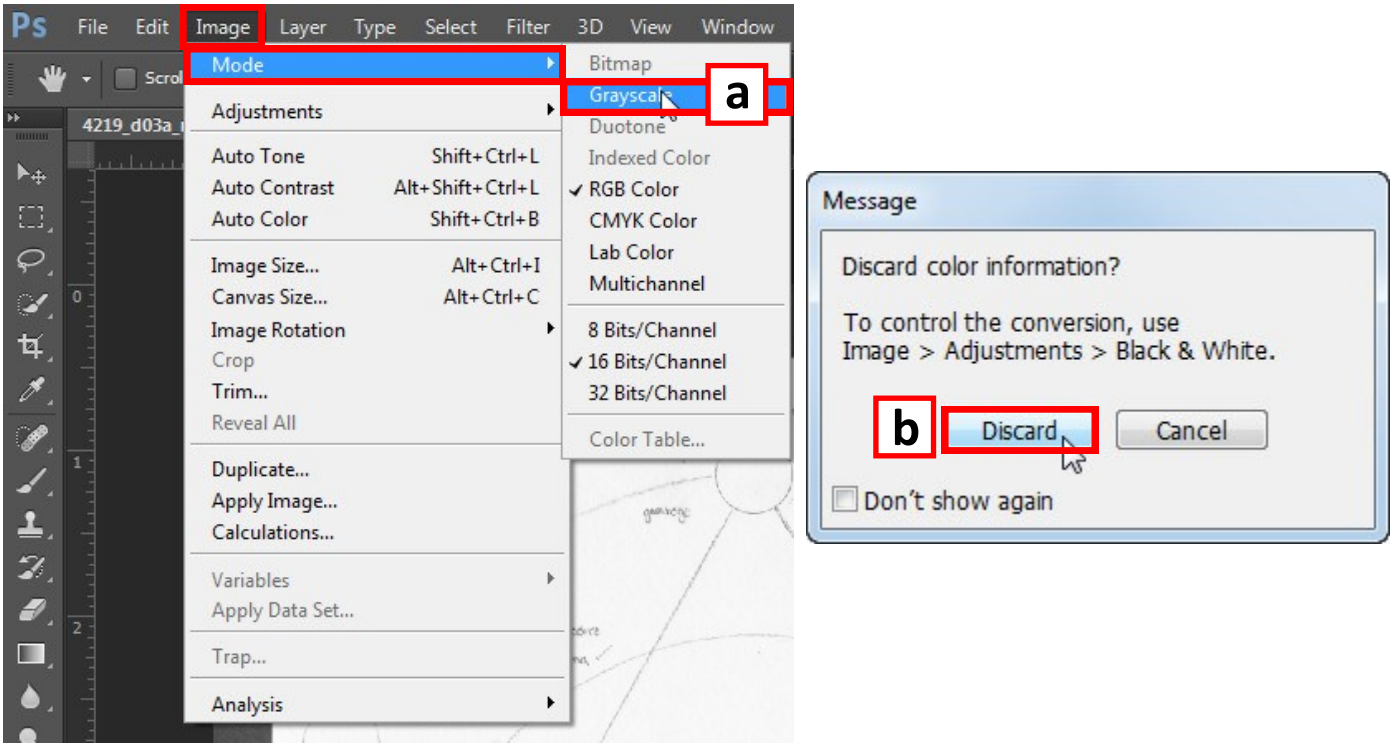
File
Edit
Image
Layer
Type
Select
Filter
3D
View
Window
Mode
Adjustments
Auto Tone Shift+Ctrl+L
Auto Contrast Alt+Shift+Ctrl+L
Auto Color Shift+Ctrl+B
Image Size... Alt+Ctrl+I
Canvas Size... Alt+Ctrl+C
Image Rotation
Crop
Trim...
Reveal All
Duplicate...
Apply Image...
Calculations...
Variables
Apply Data Set...
Trap...
Analysis
Bitmap
Grayscale
Duotone
Indexed Color
RGB Color
CMYK Color
Lab Color
Multichannel
8 Bits/Channel
16 Bits/Channel
32 Bits/Channel
Color Table...
a
Message
Discard color information?
To control the conversion, use
Image > Adjustments > Black & White.
b
Discard
Cancel
Don't show again

Figure 18.08

Section 18—Reflected Ultraviolet (Modified Camera)

Image Post-Processing

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.