

CCS America
Lindsey Sullivan



Blister Pack Inspection Report



Date: 2024/3/25

CCS Inc.

Sales Rep: Barbara Gagnon

AE: Lindsey Sullivan

Application Test

Inspection

- Blister pack inspection
- Varieties of packages, pills also change color and size,
- Inspect for: Right number, right color, not broken, confirm lot number and expiration date, package integrity

Imaging Conditions

FOV: 4" X 5"

Camera: 2MP, monochrome

Line speed: NA

Space Limitations: NA

Presentation: Both sides of the package will be presented to the camera at some point

■ Proposal

Front side: LFXV-200SW and
HPR2-200SW
Back side: LFXV-200SW

■ Result

- Front side: all but one of the packs were able to be inspected with the LFXV. One expiration date was embossed and could not be seen with that light. A second station with a low angle ring light would be required to inspect those packs

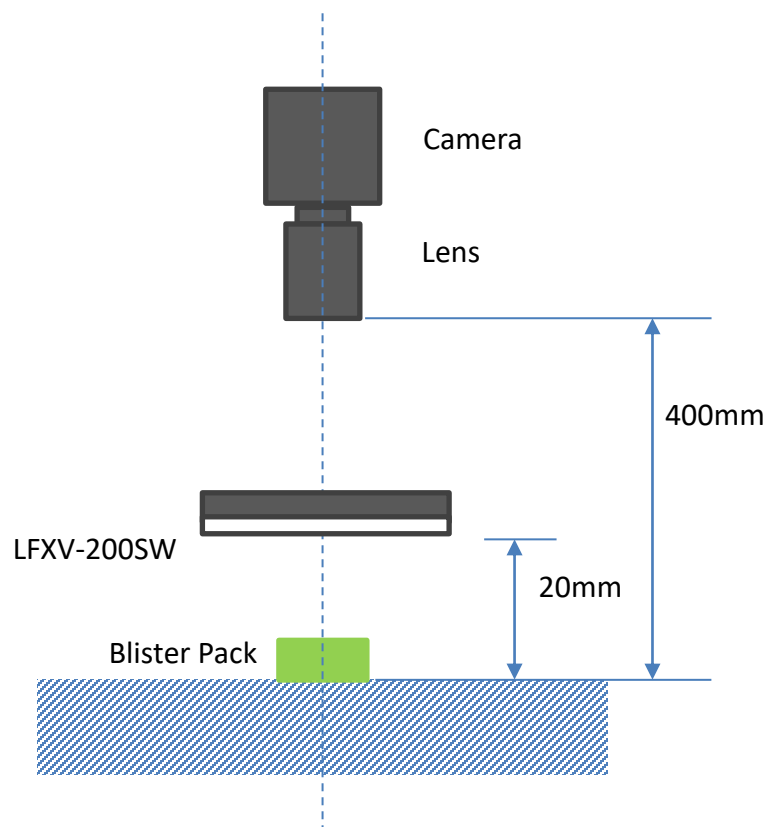
■ Reasoning

- Color: wavelength was not important on the front side inspection but was important on the back side.
- To inspect multiple colors a white light is recommended.

Front Side: Printed Text



Lighting Configuration



Light Model(s)	LFXV-200SW
Option(s)	NA
Intensity Value	204/255 (80%)
Camera	5 MP monochrome
Shutter Speed	NA
Lens	f35mm
Extension Tube	—
Aperture	F11
Control Unit	PD3 series

Resulting Images - BA



The lot code is clear and would be easy to read

Resulting Images - BADF



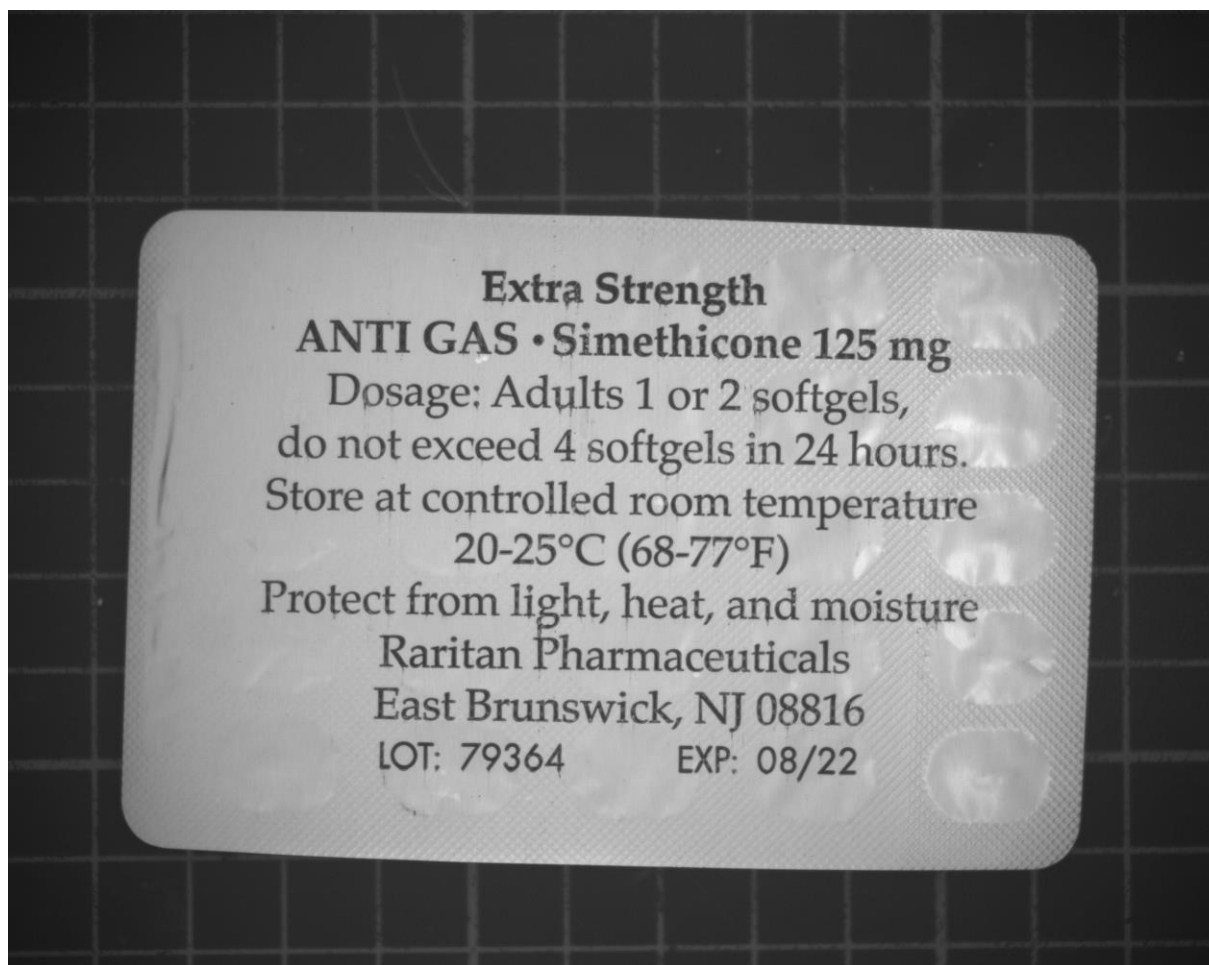
The lot code is clear and would be easy to read

Resulting Images - DPE



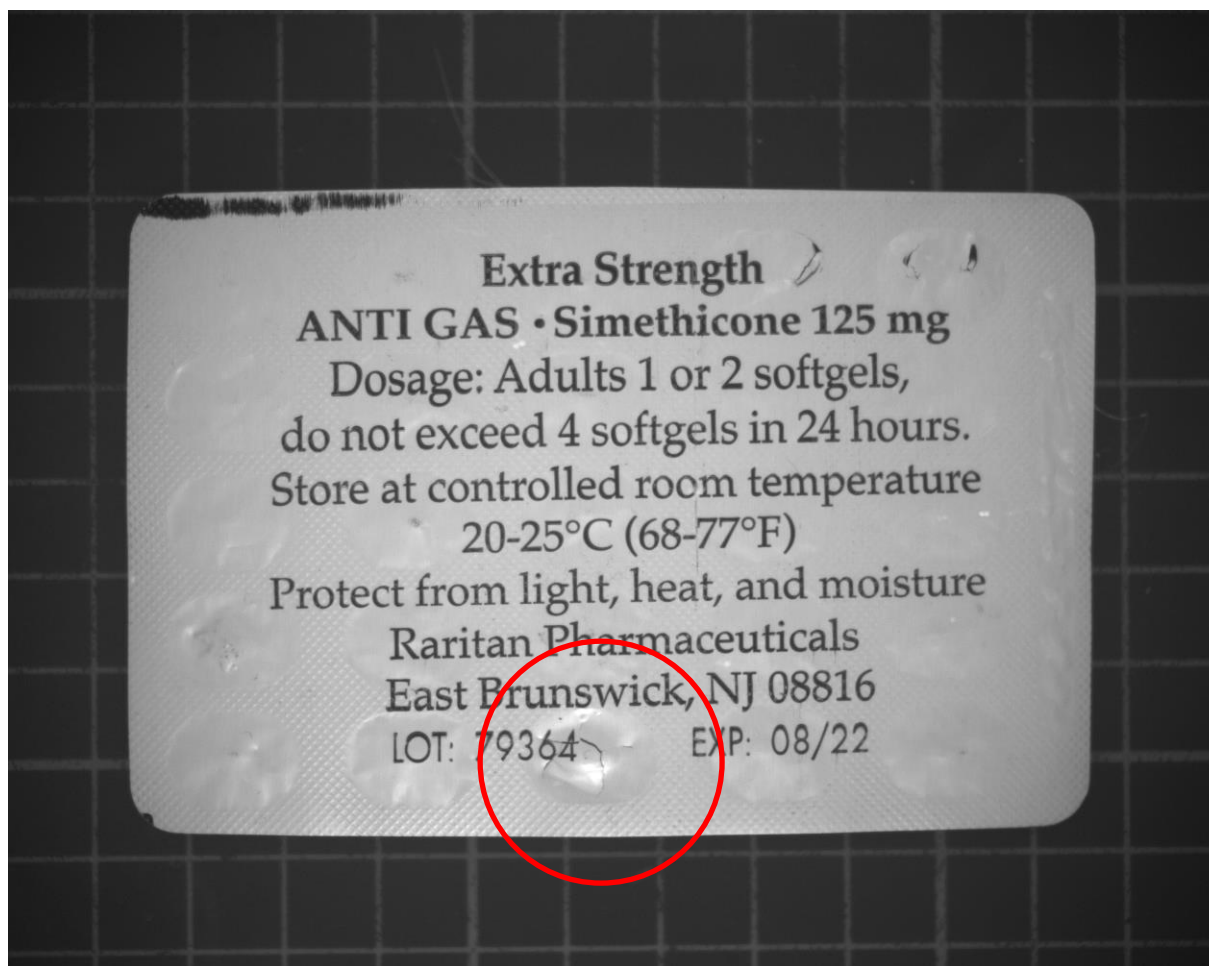
The lot code is clear and would be easy to read. The defective packaging is also easy to detect.

Resulting Images - EASG



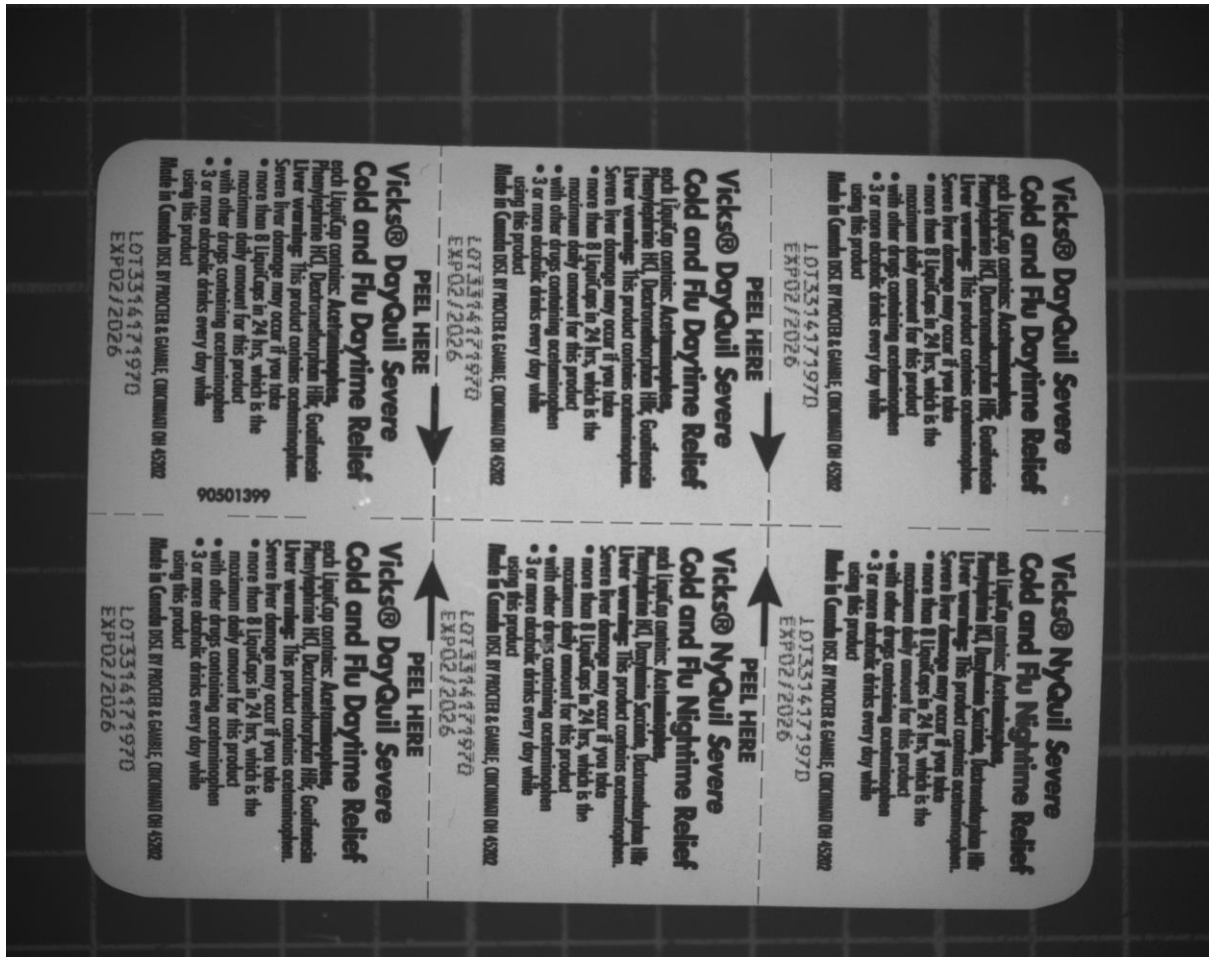
The lot code is clear and would be easy to read

Resulting Images – EASG NG



The defects on the top are clear to see, however might be hard to detect if they fall on the text (see red circle)

Resulting Images - NYQ



The lot code is clear and would be easy to read

Resulting Images - SPE



The lot code is clear and would be easy to read

Resulting Images - SPEMS



The lot code is clear and would be easy to read

Resulting Images - PTTF

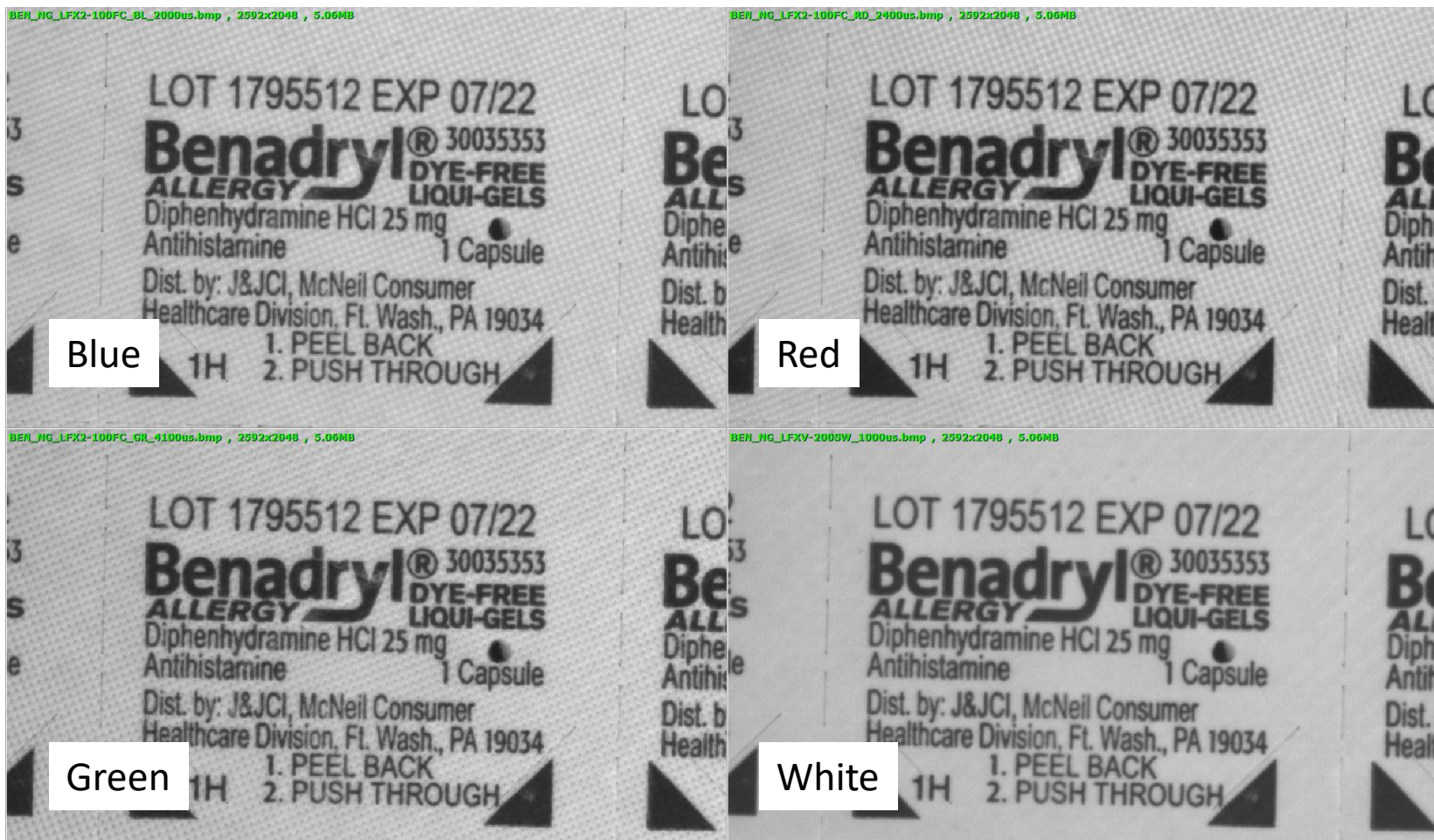


The lot code is embossed and not readable with this lighting configuration.

Reference Data

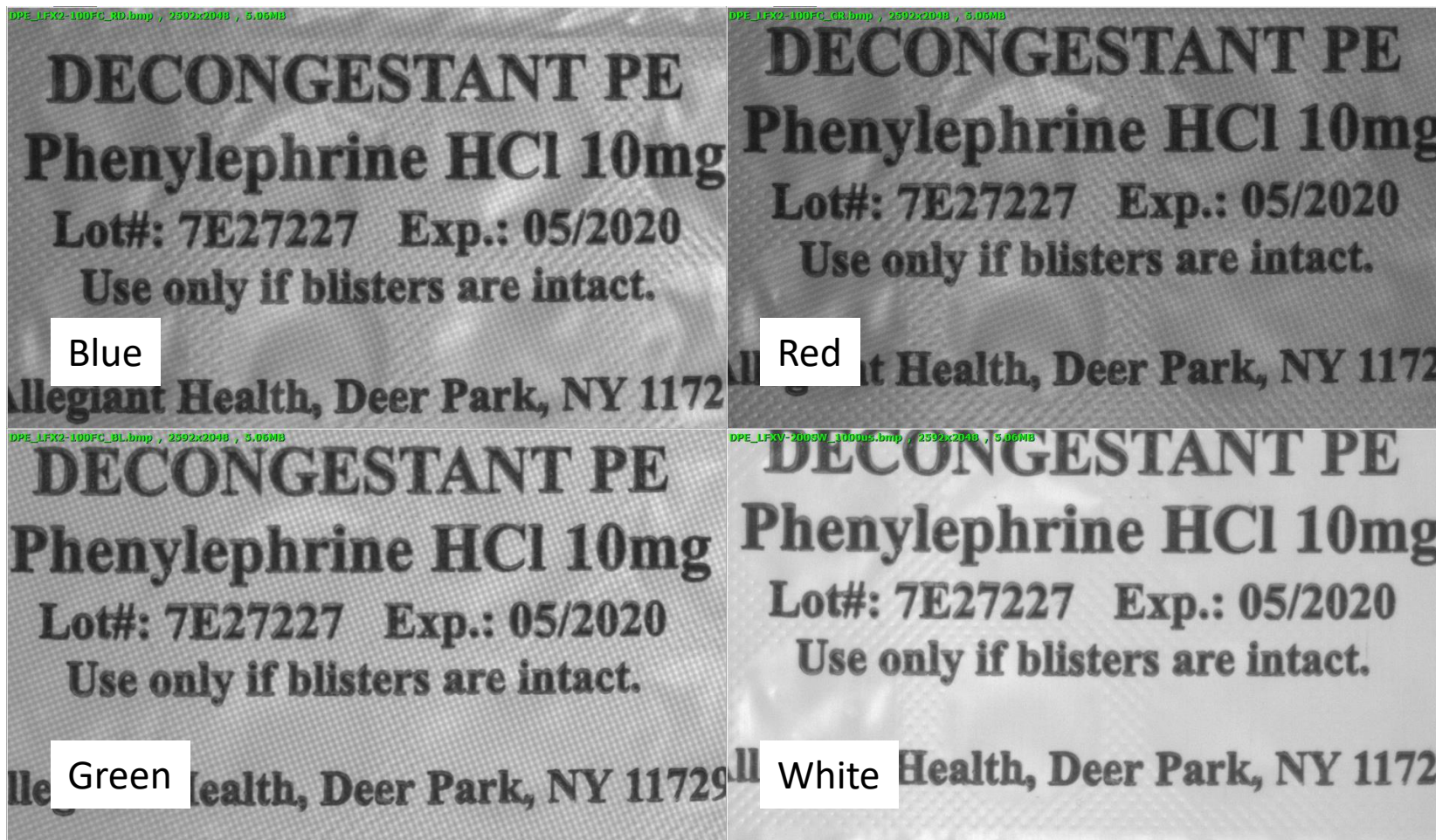


Wavelength Comparison



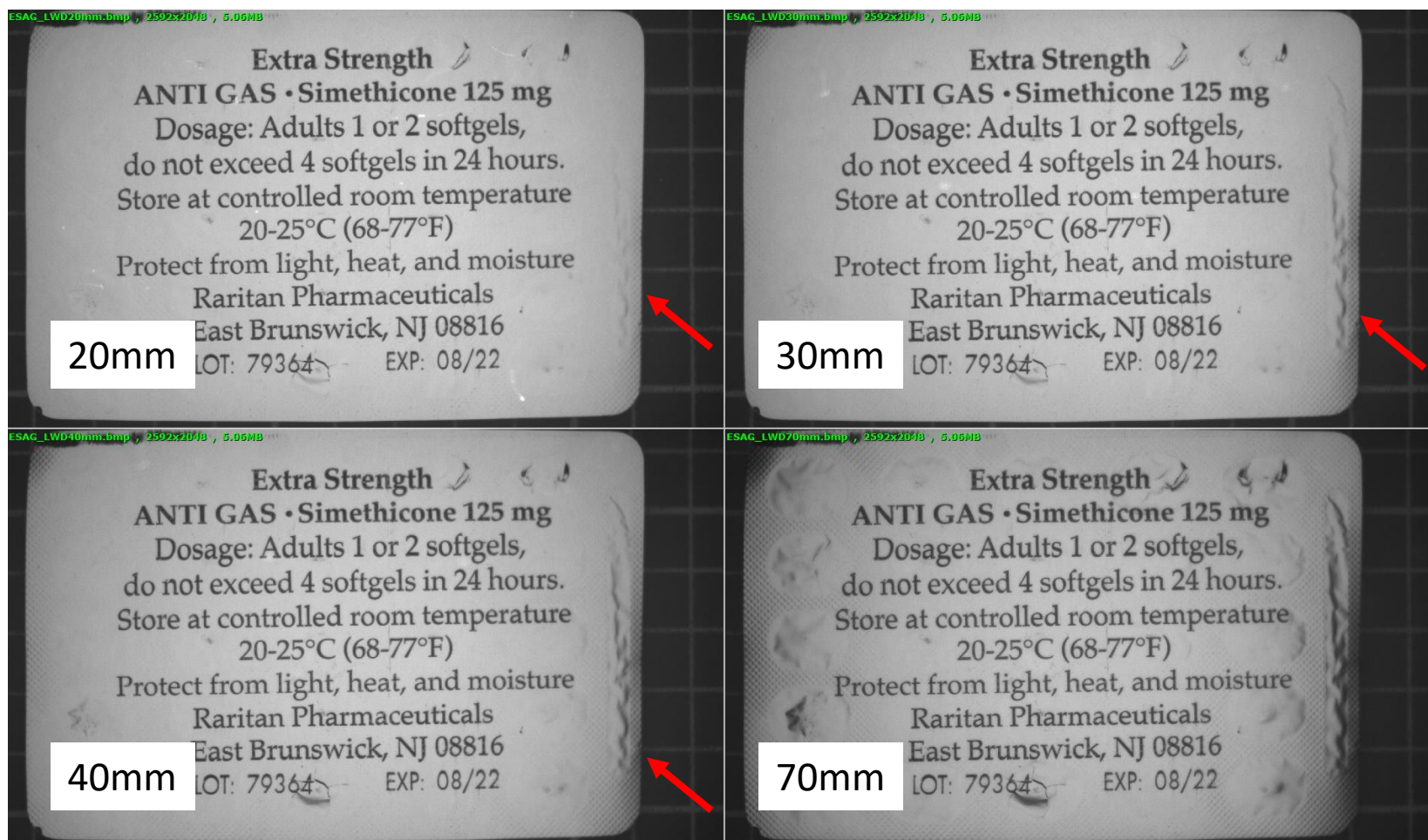
The wavelength does not make a difference in the samples we have. White is recommended for future flexibility.

Wavelength Comparison



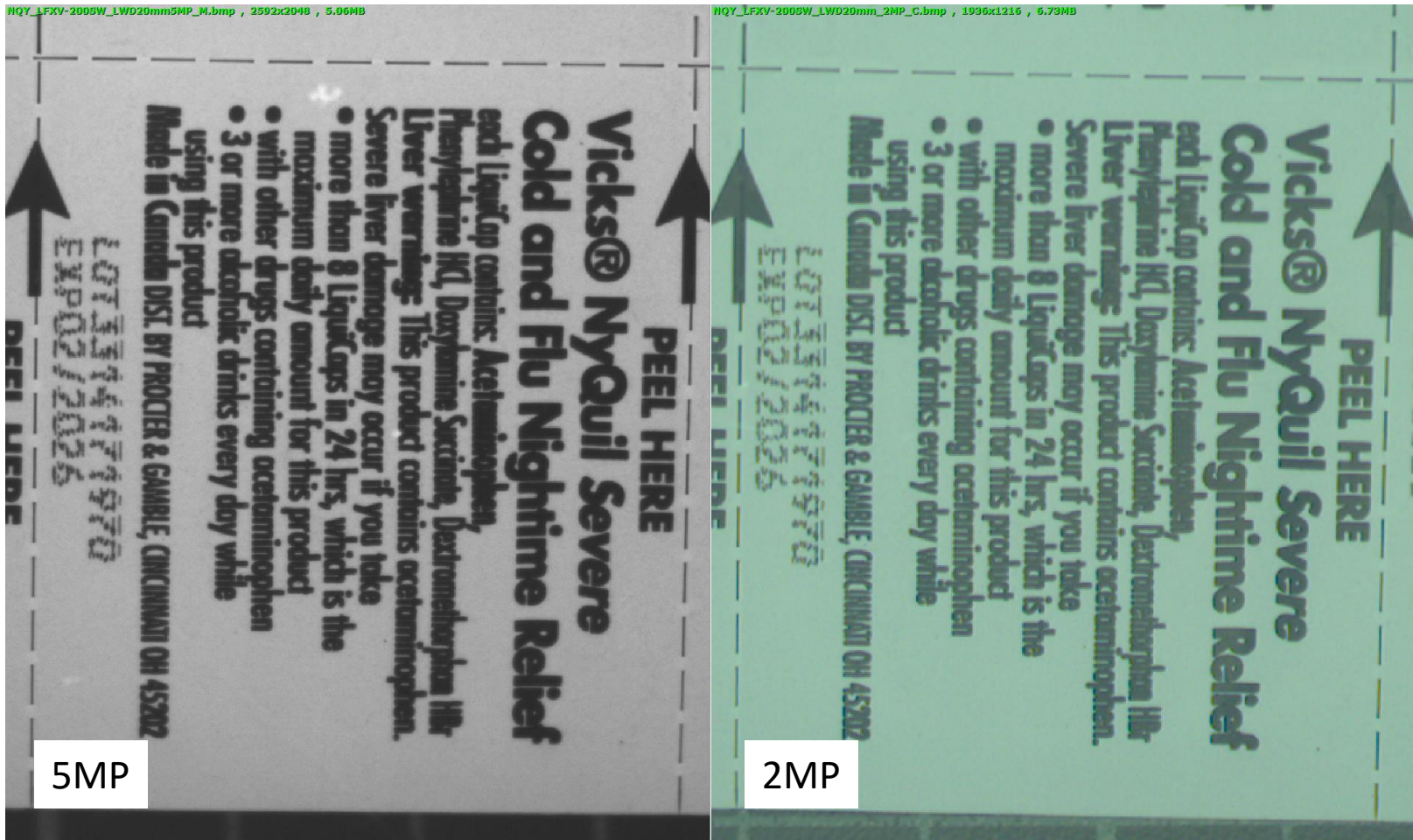
The wavelength does not make a difference in the samples we have. White is recommended for future flexibility.

LWD Comparison



20mm – 40mm is not a drastic difference, however, at 20mm there are fewer wrinkles on the side resulting in a flatter and clearer image.

Camera Megapixel Comparison



The image quality on the 5MP is better for readability, and the math proves the 5MP is the correct option.

The Math

$$I_R = \frac{D}{P_D} = \frac{2 \text{ mm (X)}}{30 \text{ pixels}} = 0.067 \text{ mm/pixel}$$

$$R_P = \frac{FOV(X)}{\text{Image Resolution}} = \frac{153 \text{ mm}}{0.067 \text{ mm/pixel}} = 2,284 \text{ pixels}$$

minimum camera resolution in X direction is 2,284 pixels
 \Rightarrow 5 MP (2592x2048)

Confirm Y direction $\Rightarrow 2048 \times .067 = 137 \text{ mm} \approx 5 \text{ in}$

5 MP Camera – 2592x2048

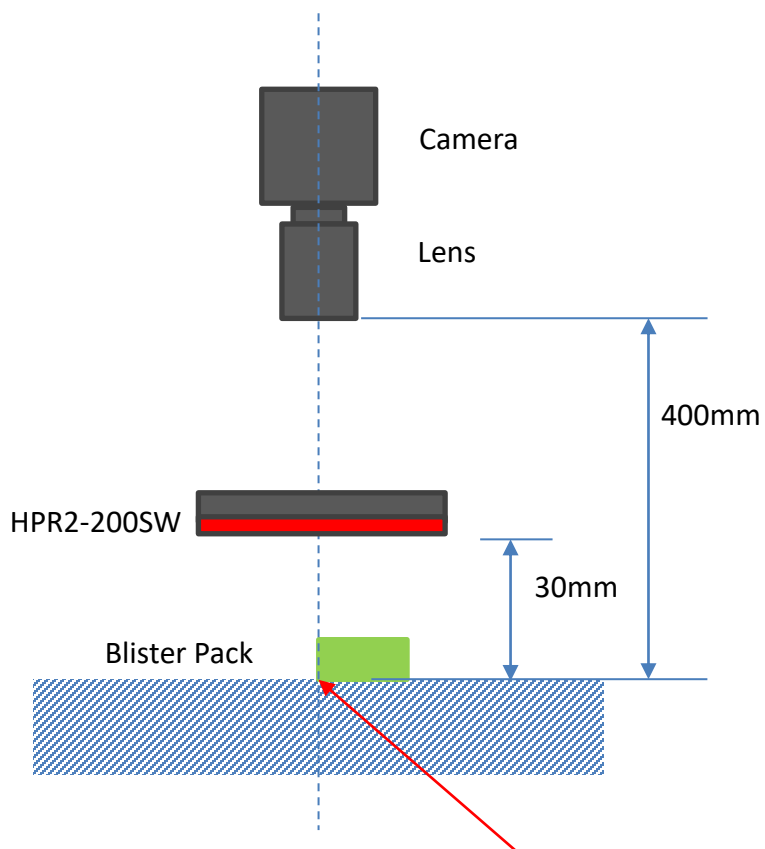
$$I_R = \frac{D}{P_D} ; R_P = \frac{FOV}{\text{Image Resolution}}$$

- R_P = Resolving Power
- I_R = Minimum *Image Resolution*
- D = Smallest defect size
- P_D = Pixels per defect

Front Side: Embossed Text



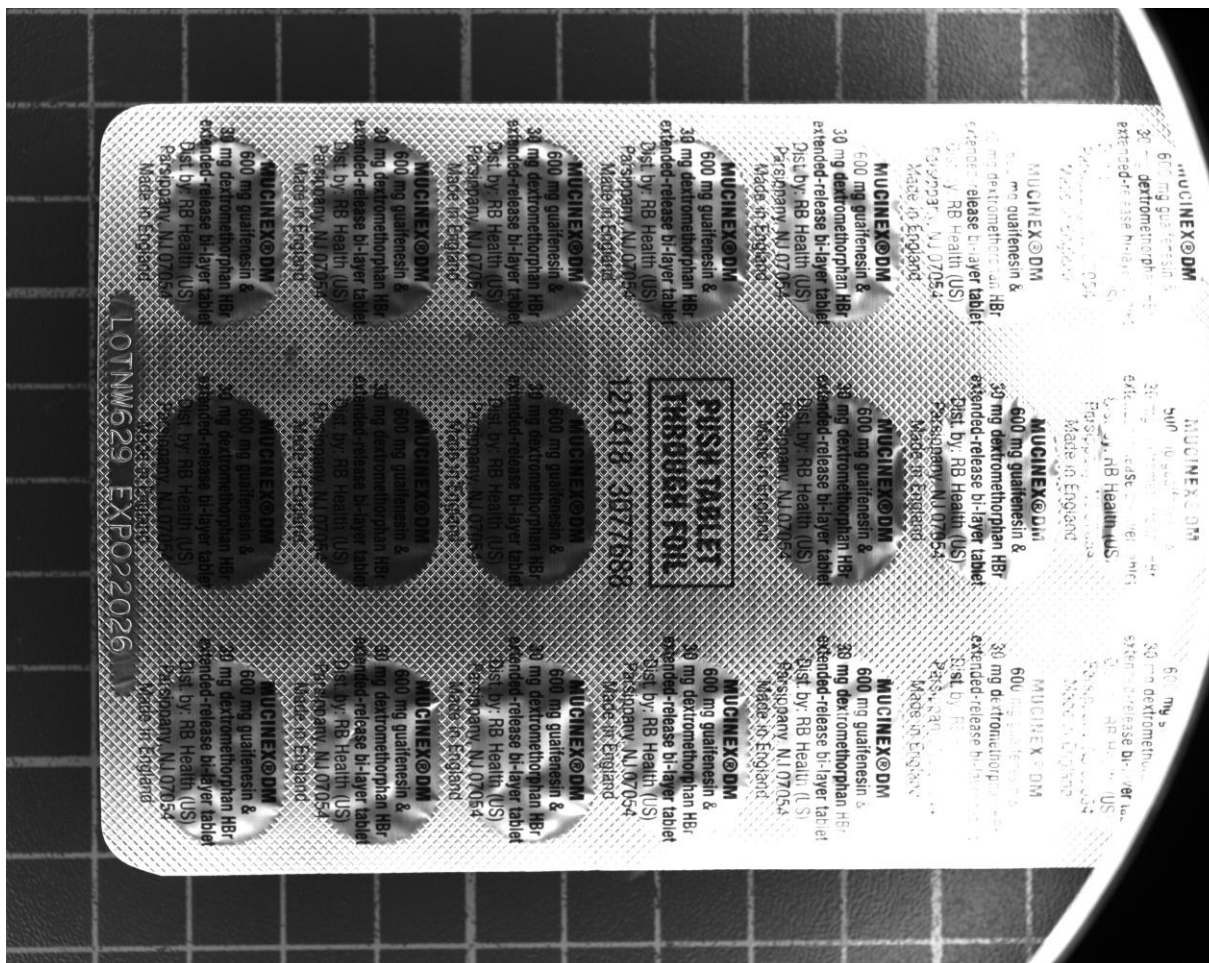
Lighting Configuration



Center the light over the embossed code and not the work piece

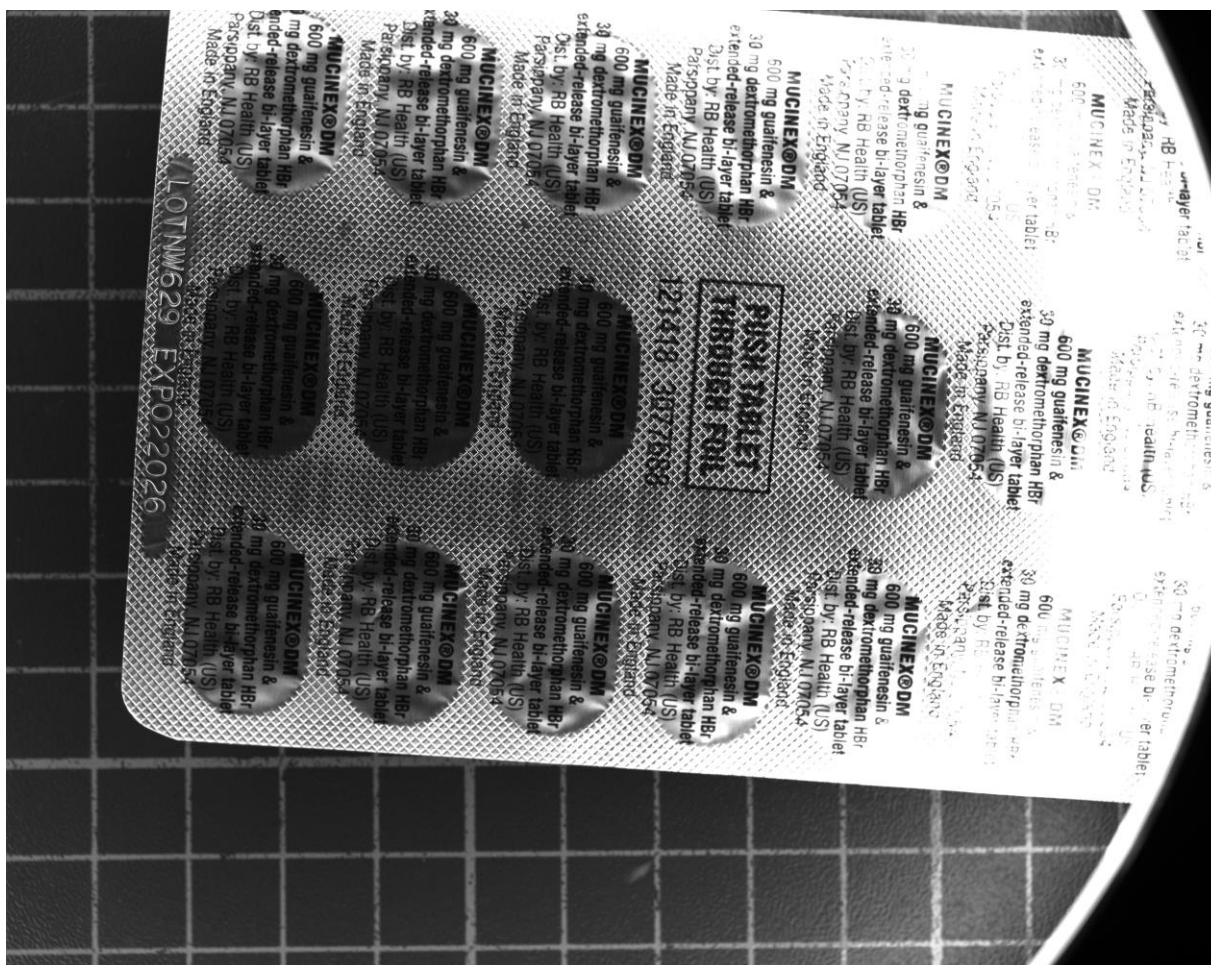
Light Model(s)	HPR2-200SW
Option(s)	NA
Intensity Value	204/255 (80%)
Camera	5 MP monochrome
Shutter Speed	NA
Lens	f35mm
Extension Tube	—
Aperture	F11
Control Unit	PD3 series

Resulting Images - SPEMS



The lot code has contrast and would be readable.

Resulting Images - SPEMS

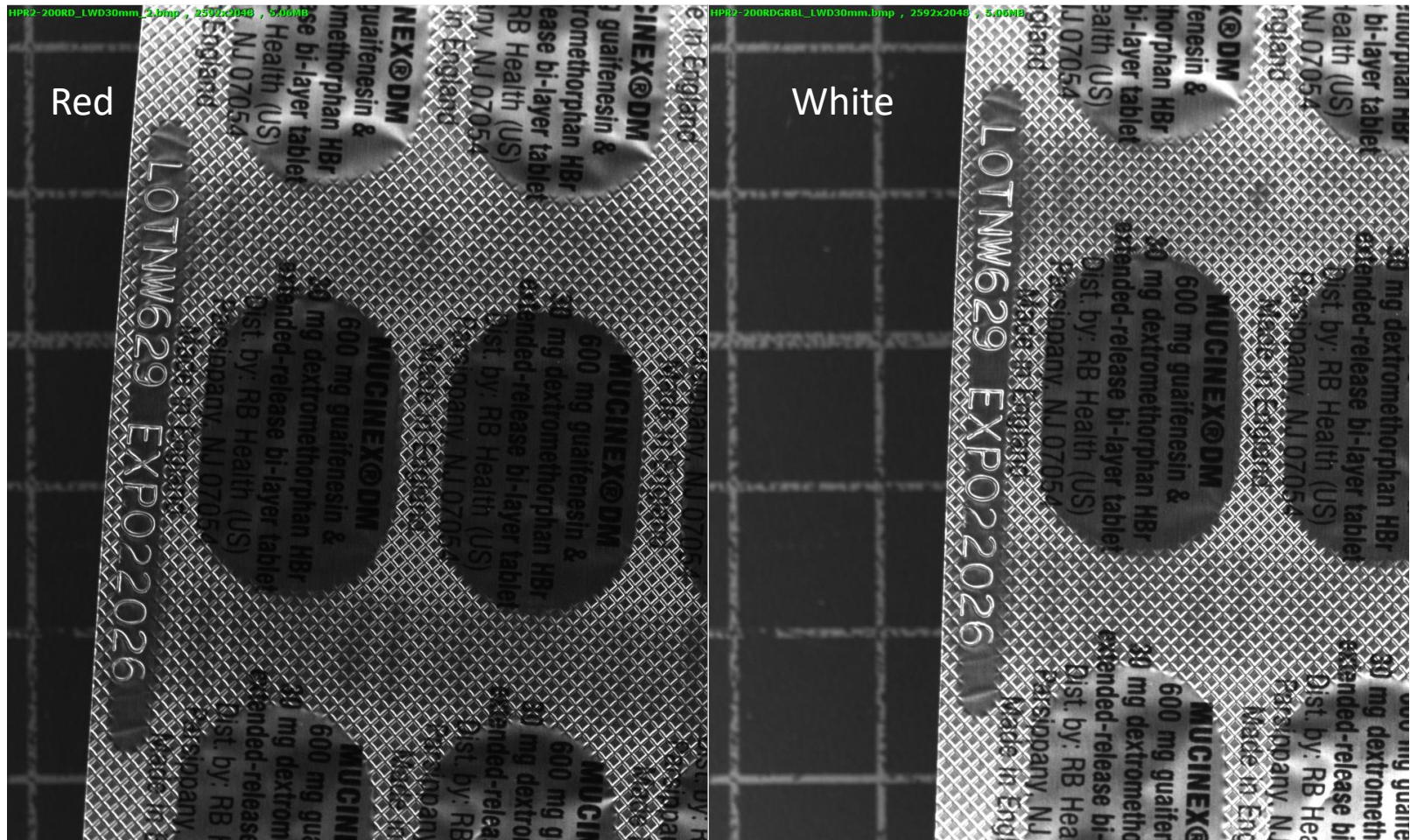


Even with the change in the placement, the code is still readable

Reference Data

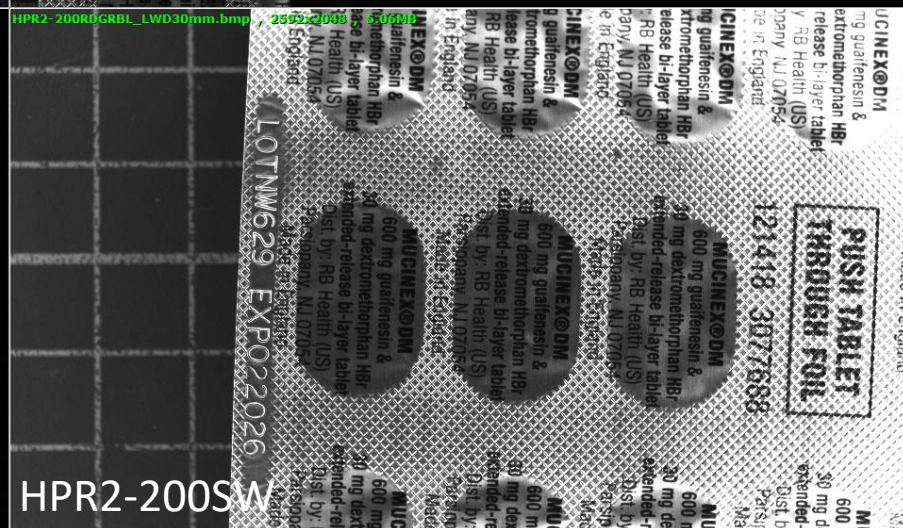
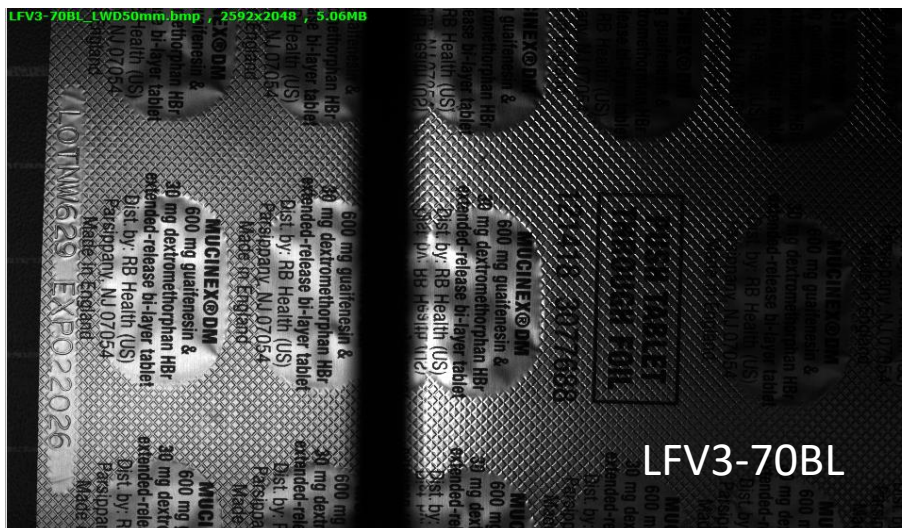


Red vs White Wavelengths



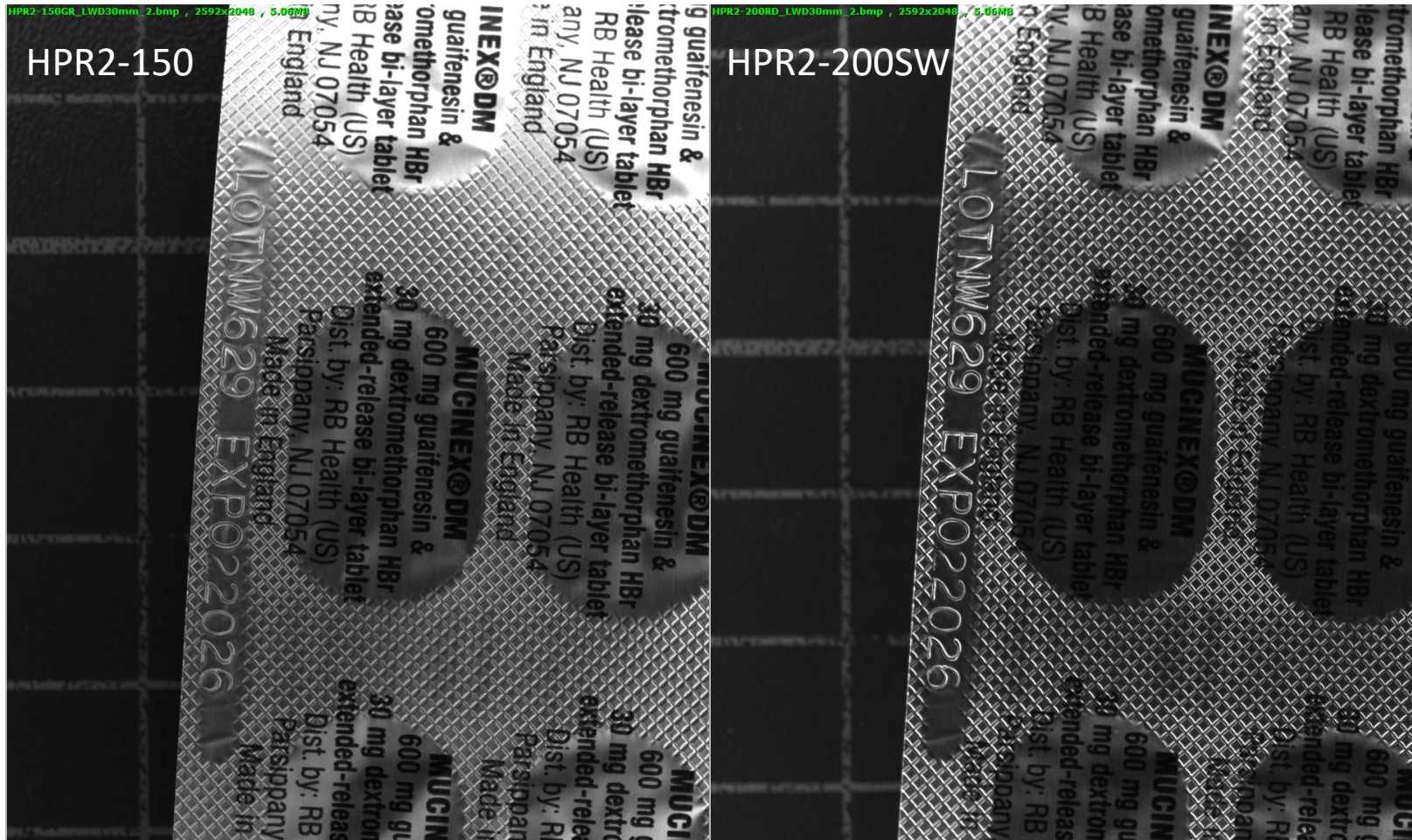
White provided better contrast, likely due to the intensity, but will be more neutral for other samples if they vary in color

Form Factors



White provided better contrast, likely due to the intensity, but will be more neutral for other samples if they vary

Form Factors

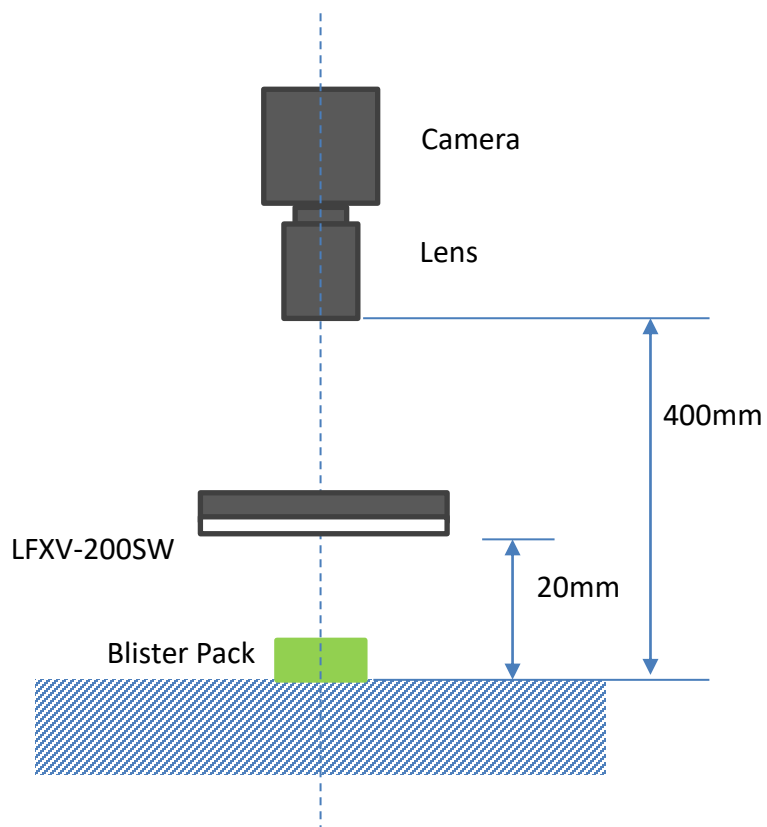


The 150mm size is too small. If the sample is placed too far from the center contrast is lost with the smaller light.

Back Side: Pill Inspection

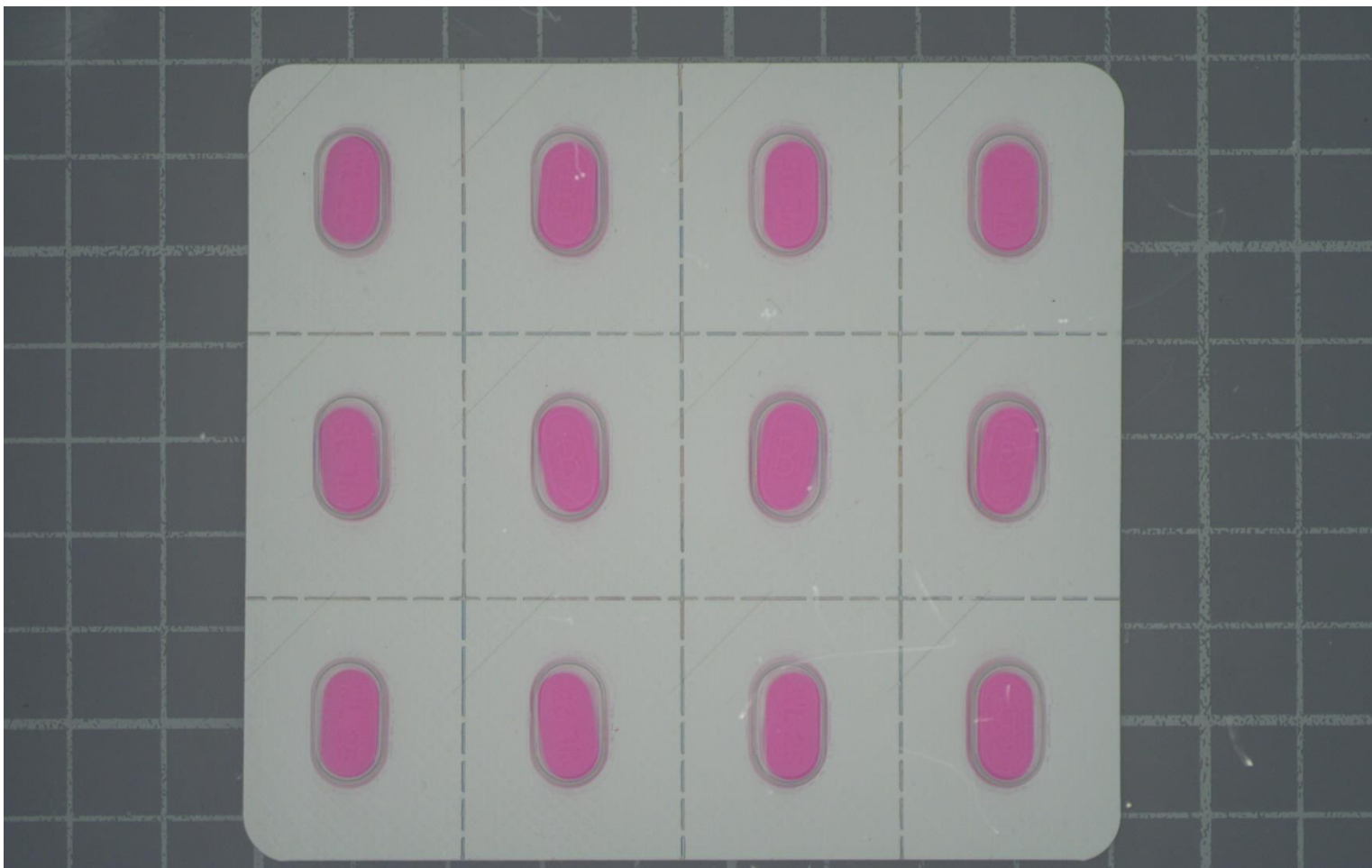


Lighting Configuration



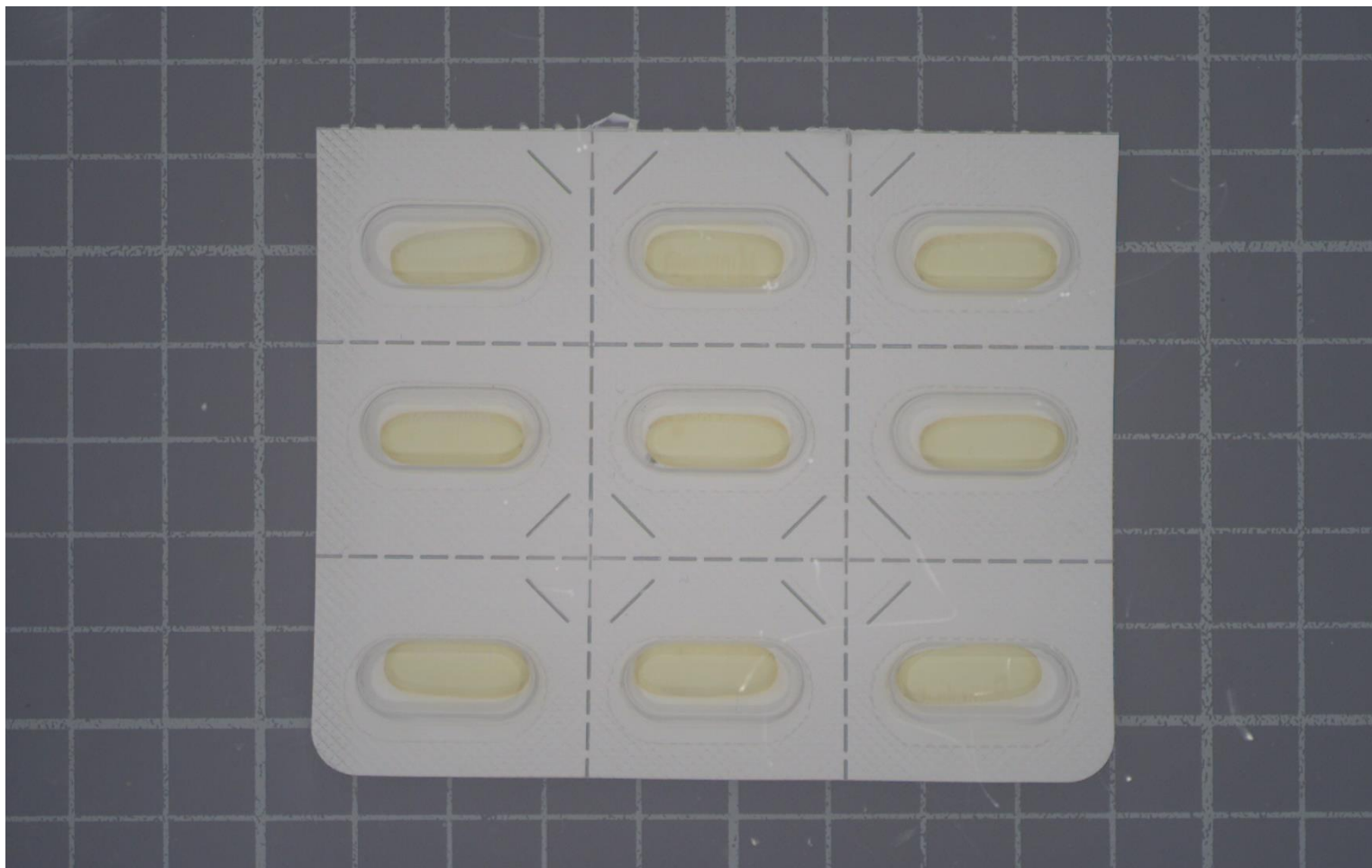
Light Model(s)	LFXV-200SW
Option(s)	NA
Intensity Value	204/255 (80%)
Camera	2 or 5 MP Color
Shutter Speed	NA
Lens	f35mm
Extension Tube	—
Aperture	F11
Control Unit	PD4 series

Resulting Images - BA



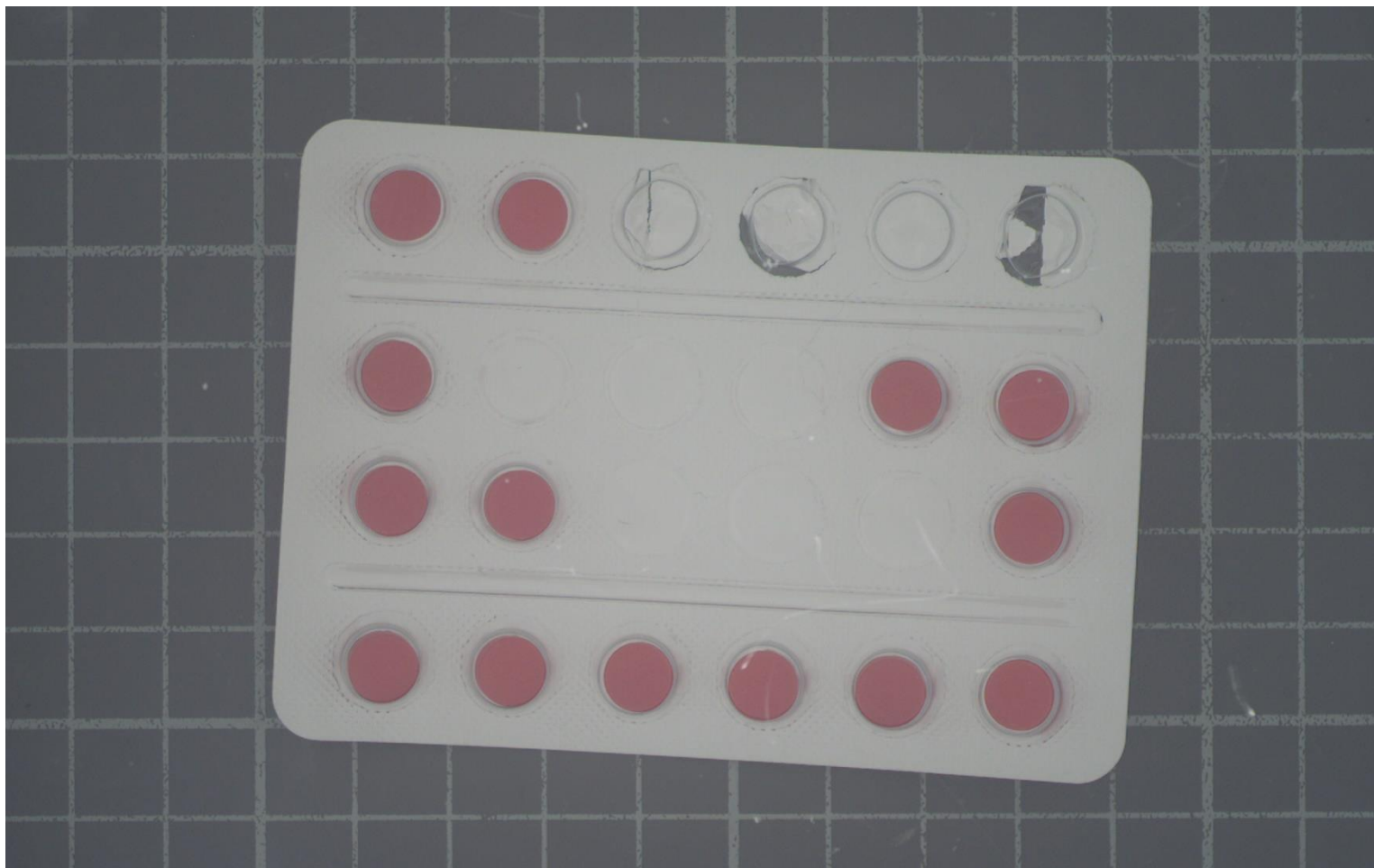
The color camera shows the pills clearly to determine if the correct number are present and the pills are correct

Resulting Images - BADF



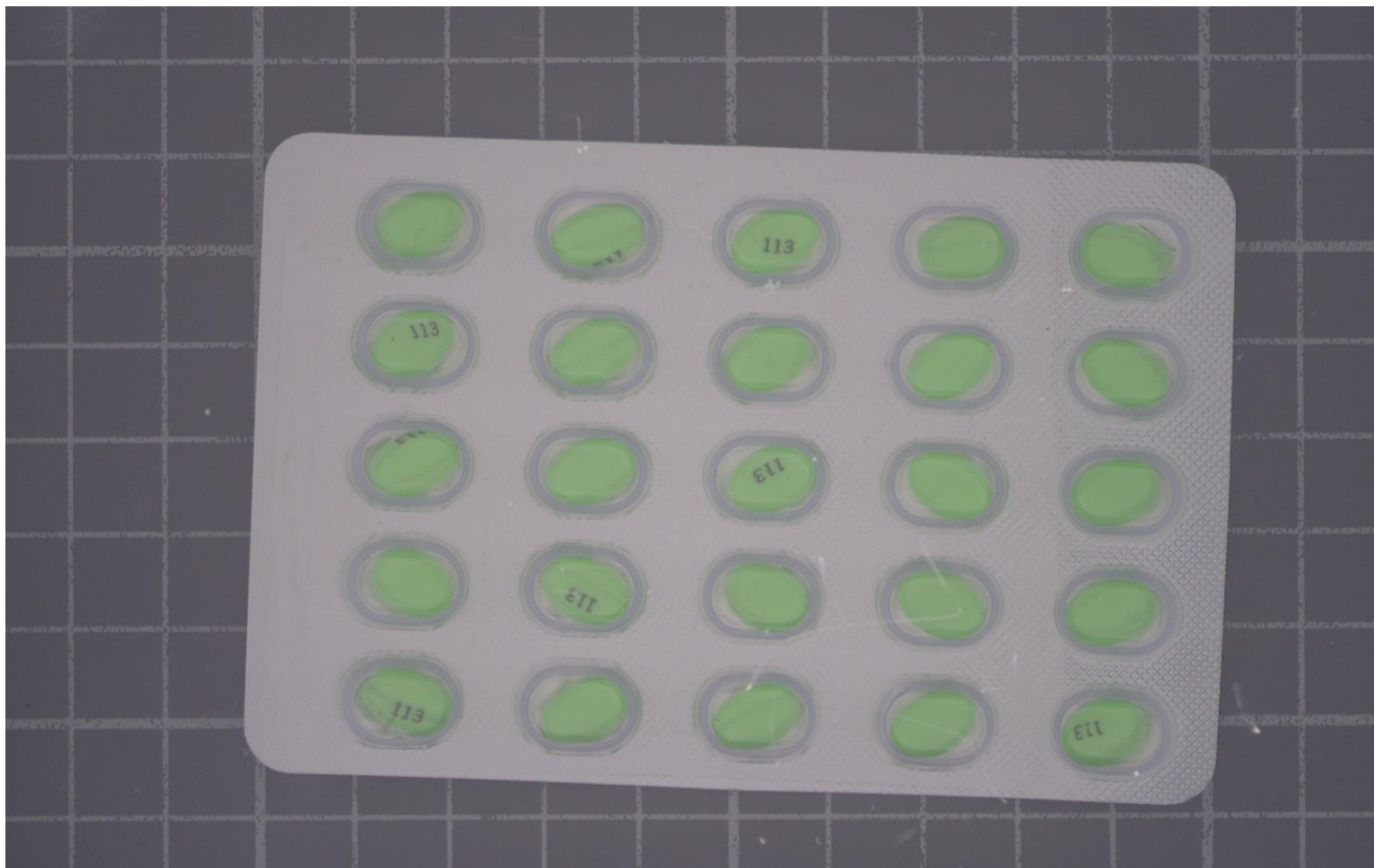
The color camera shows the pills clearly to determine if the correct number are present and the pills are correct

Resulting Images - DPE



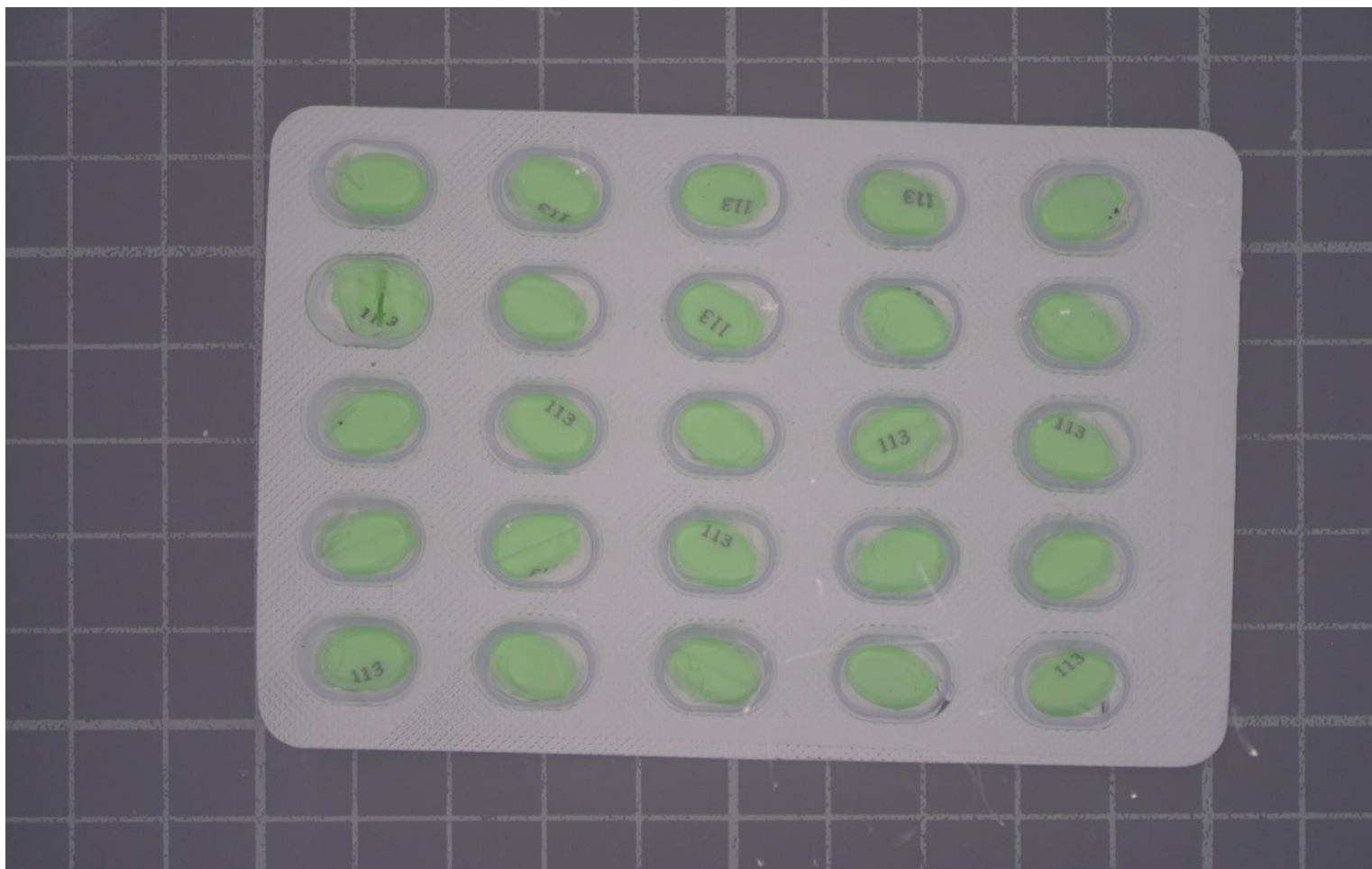
The color camera shows the pills are missing. This also reinforces the damaged pill inspection.

Resulting Images – EASG OK



The color camera shows the pills clearly to determine if the correct number are present and the pills are correct

Resulting Images – EASG NG



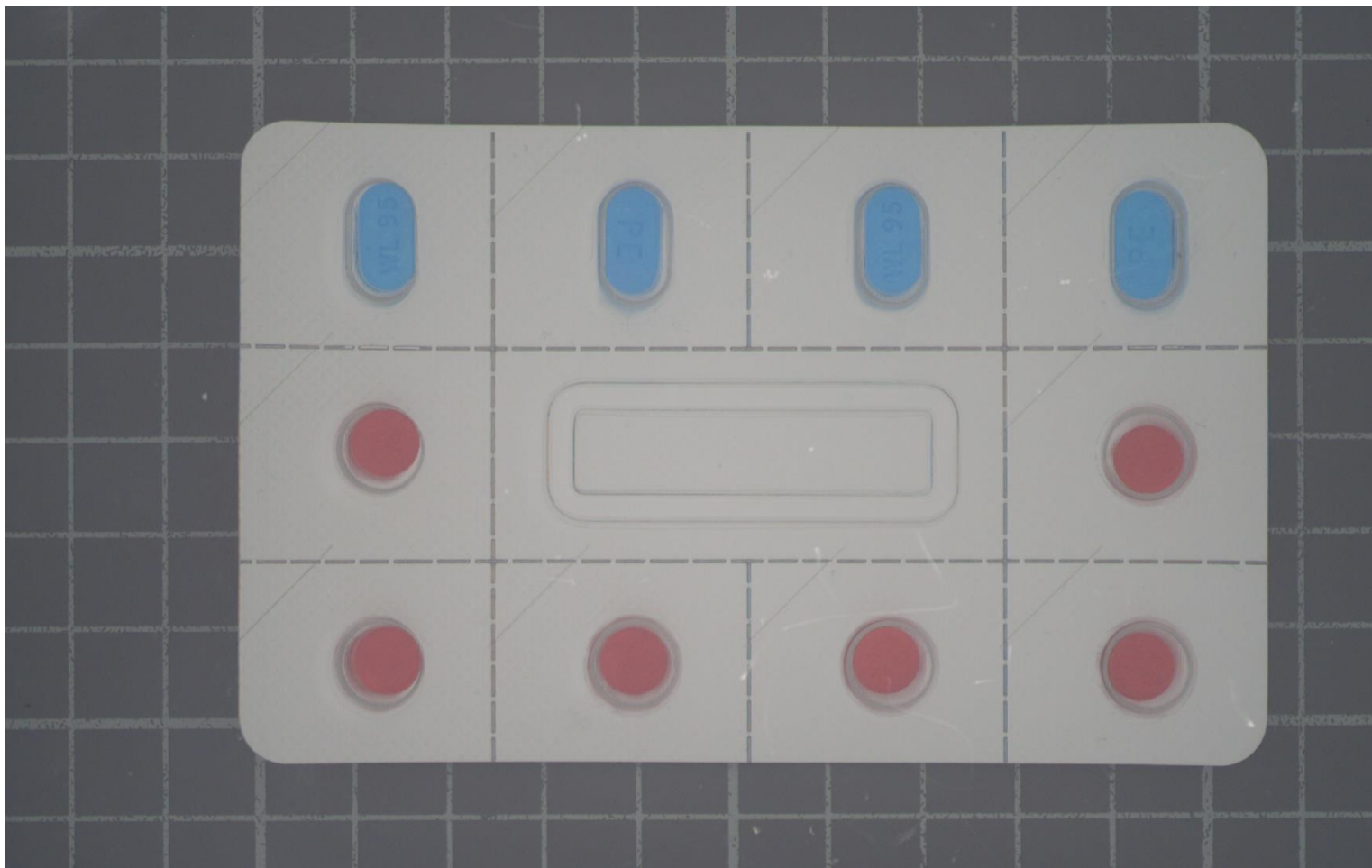
The defective pill is visible with the color camera

Resulting Images - NYQ



The color camera shows the pills clearly to determine if the correct number are present and the pills are correct

Resulting Images - SPE



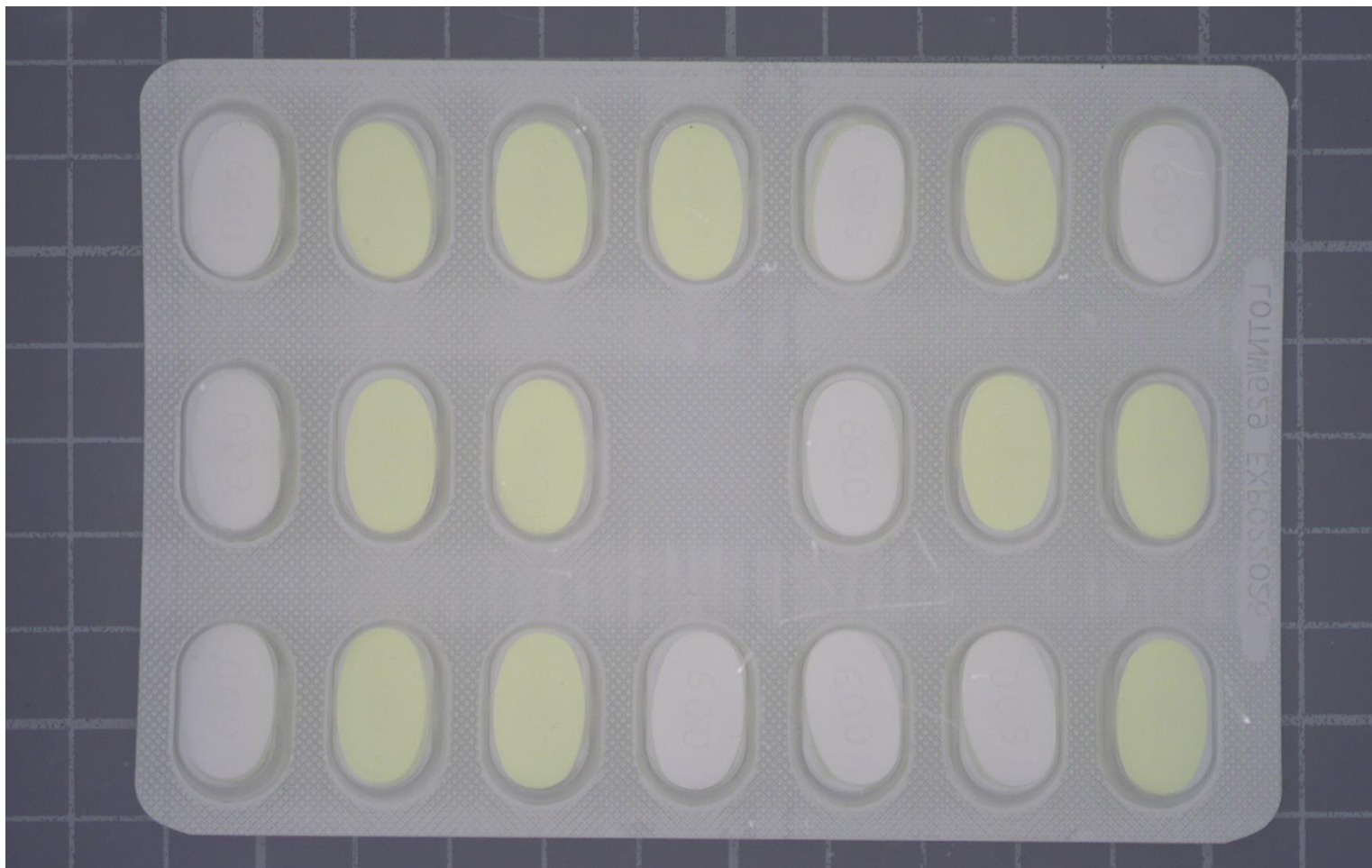
The color camera shows the pills clearly to determine if the correct number are present and the pills are correct

Resulting Images - SPEMS



The color camera shows the pills clearly to determine if the correct number are present and the pills are correct

Resulting Images - PTF



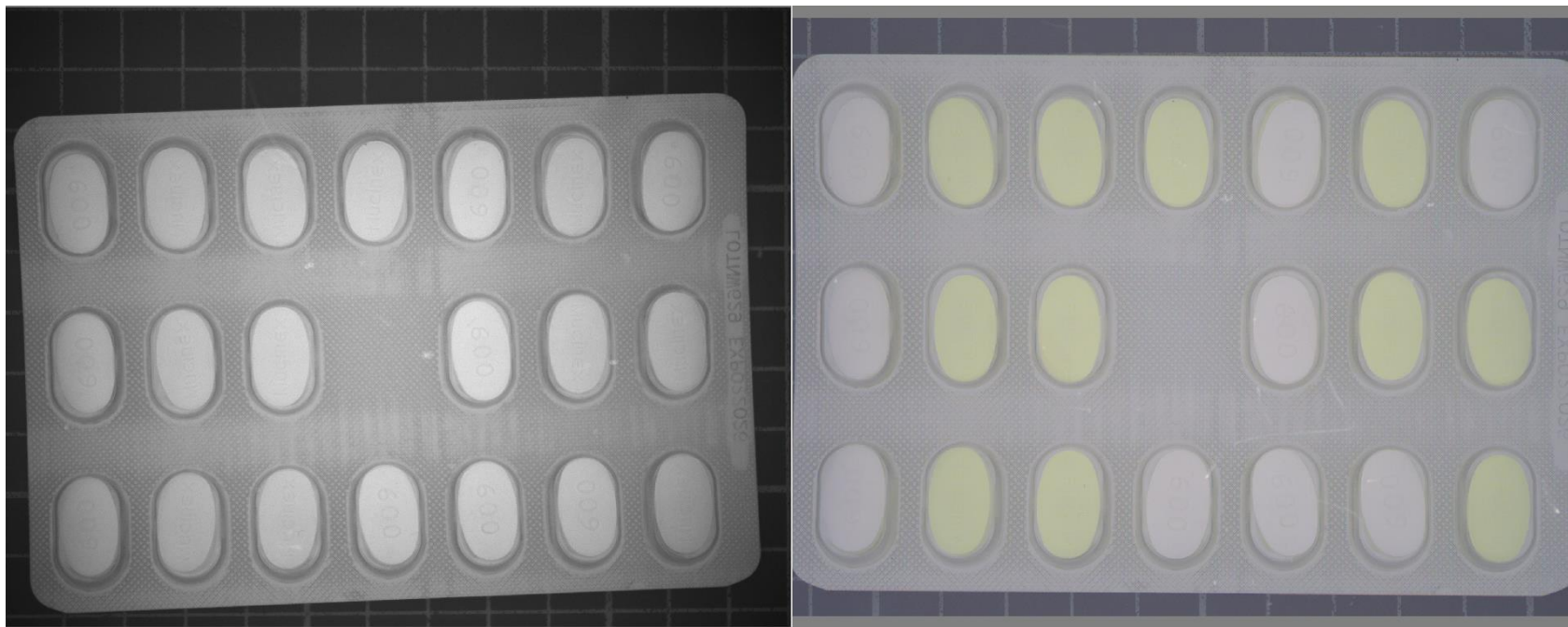
The white and yellow pills are distinguishable with the color camera

Reference Data



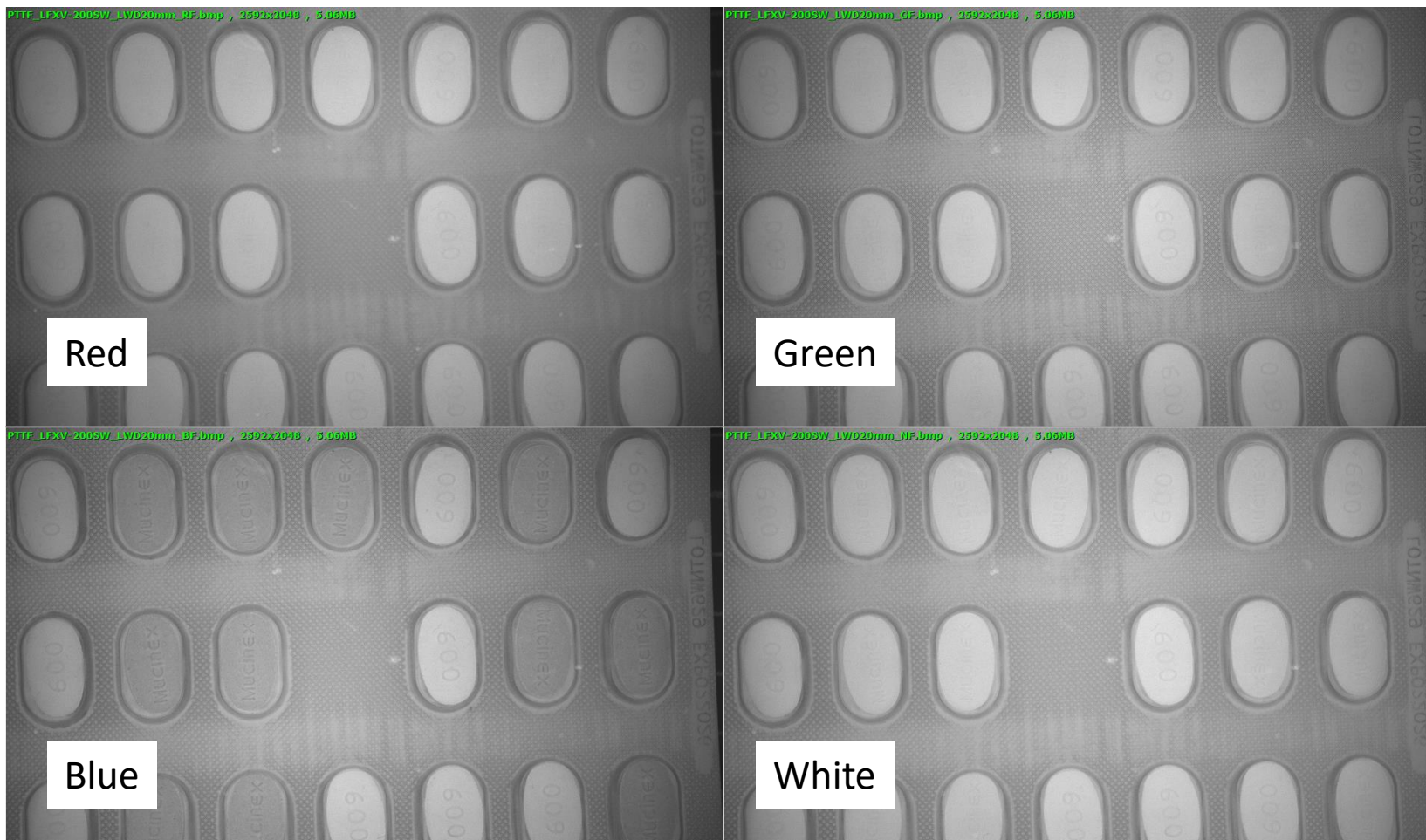
Monochrome vs Color Camera

Both images taken with a LFXV-200SW



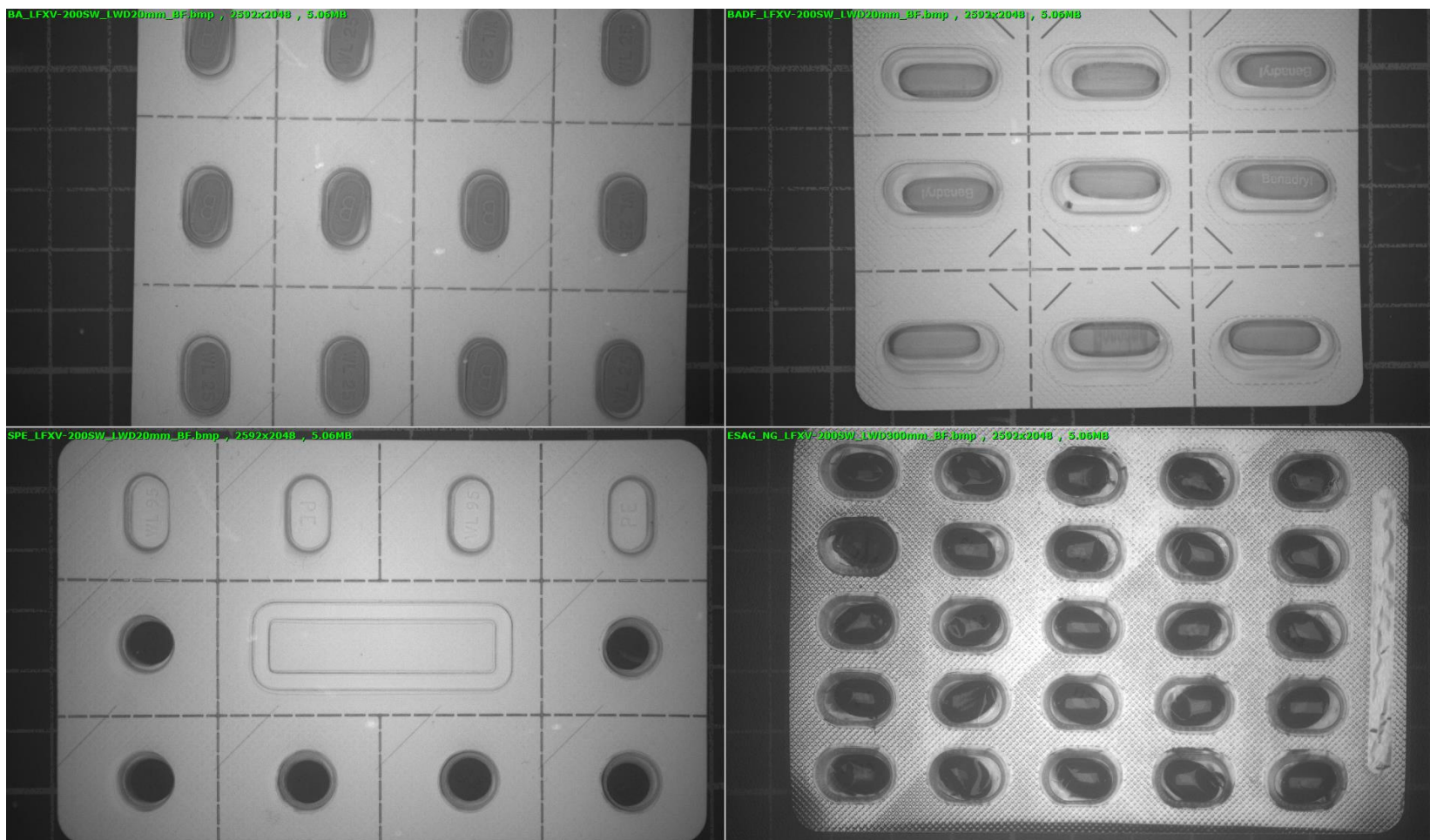
A monochrome camera cannot distinguish
the white and yellow pills

Monochrome vs Color Camera



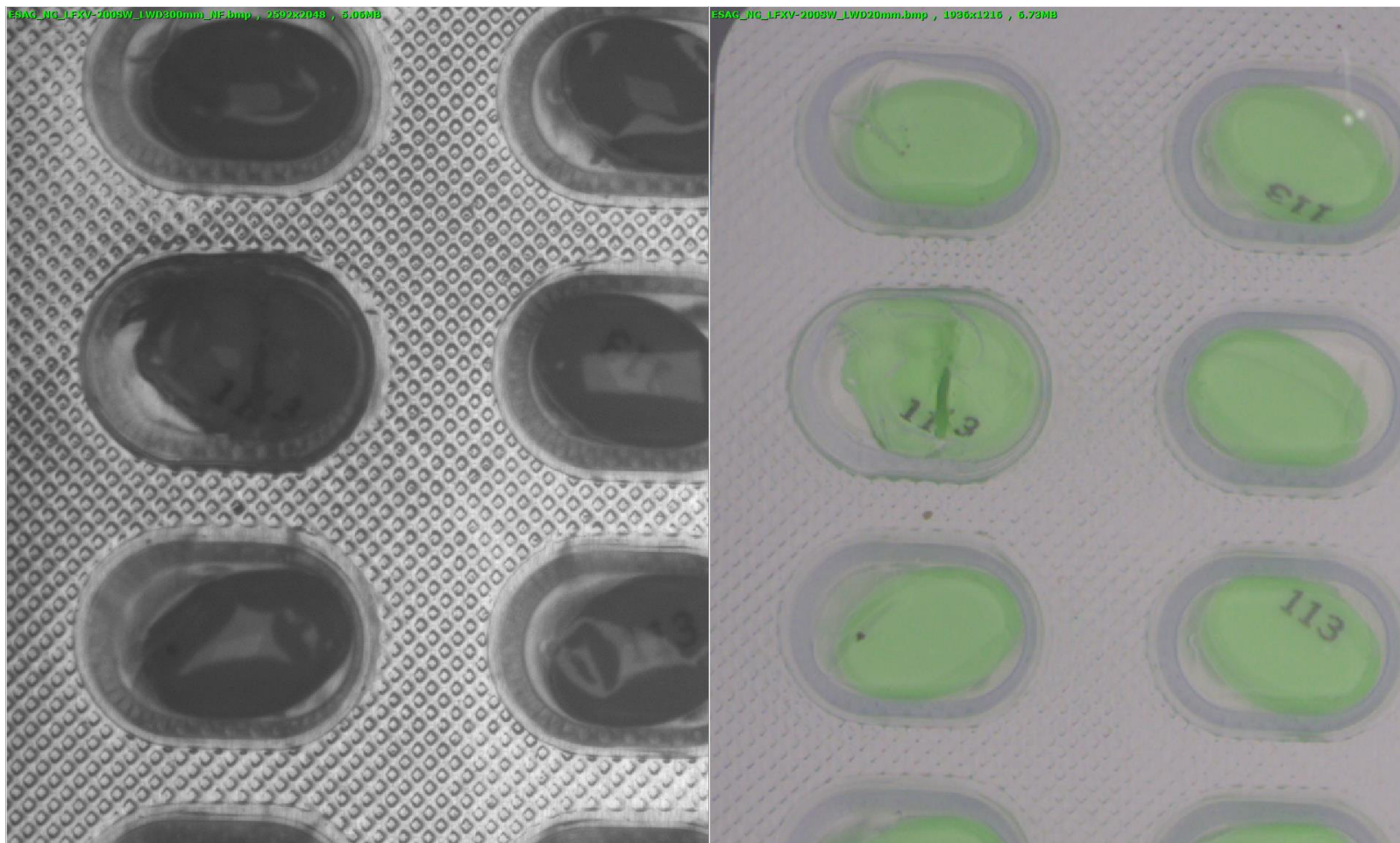
A blue light can distinguish the white and yellow pills but makes the yellow pills blend in with the top.

Blue Light on Other Packs



The EASG-NG image the damaged pill is undetectable, so a blue light will not work for all packs. Therefore, a white light would be better or a color camera.

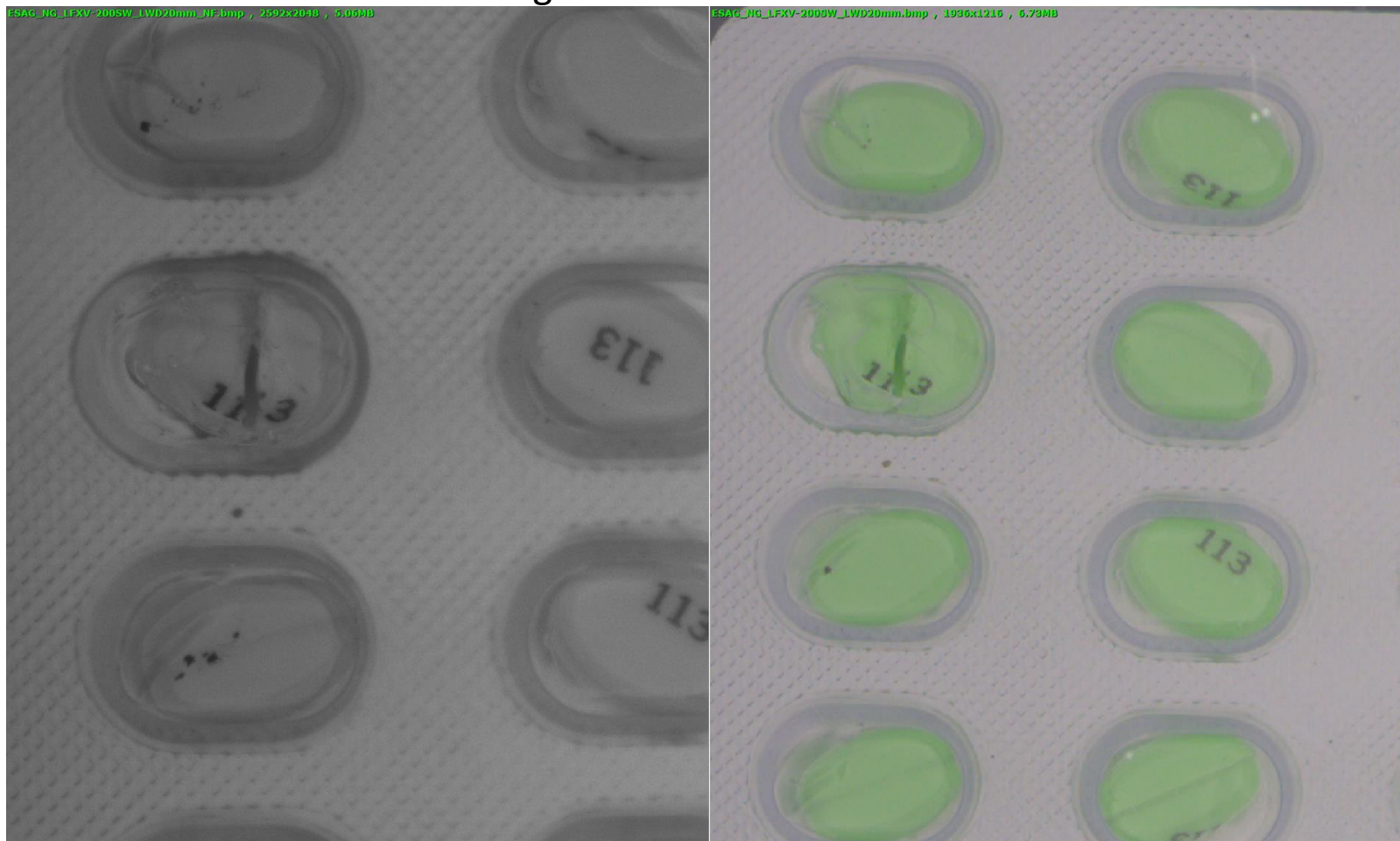
Blue Light on Other Packs



The EASG-NG image the damaged pill is undetectable, so a blue light will not work for all packs. Therefore, a white light would be better or a color camera.

Blue Light on Other Packs

Both images taken with a LFXV-200SW



The EASG-NG image of the damaged pill is detectable with monochrome and color cameras, but color is better for the other inspections.

Summary

Inspection	Side	Solution
Lot number & expiration date confirmation- printed	Front	LFXV-200SW
Lot number expiration date confirmation - embossed	Front	HPR2-200SW
Package integrity	Front	LFXV-200SW
Pills qty, color, integrity	Back	LFXV-200SW + Color Camera

Global support

Confidential



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