Frank J. Dispensa, PPA Certified, M.Photog.Cr., APM

Frank J. Dispensa was a Senior Associate Engineer for IBM and is now the President of FKD Studios in Wappingers Falls, New York. Frank has received the Master of Photograph and Photographic Craftsmen degrees and the title of Certified Professional Photographer from the Professional Photographers of America and the Accolade of Photographic Mastery from Wedding and Portrait Photographers International. He has been a Winona instructor for many years.

Frank joined the Professional Photographers of America (PPA) in 1989 and entered his first national print competition in 1990. He qualified for his Master of Photography degree in just four years.

FKD is a low-volume studio located in Wappingers Falls, New York, near the beautiful Hudson River, about seventy miles north of New York City

Creating the Perfect Negative

With Fuji NPC and Kodak Portra NC/VC 160 Films

This gray card test procedure will **calibrate your light meter and your professional lab by adjusting your light meter's ASA to allow for the variations and physical losses we all must work with**. The results will yield the correct ASA so you can create the perfect negative with Fuji NPC 160 or Kodak Portra NC/VC 160 films.

PHYSICAL LOSSES AND VARIABLES:

• Variable - Your Professional Lab's Negative Development Equipment:

Different labs will yield different negative densities depending on the type of negative development equipment used,...i.e., "Dip & Dunk", "Roller Transport," or "Cine."

• Physical - Barrel Extension Light Loss for Medium Format Lenses, *see figure (1)*:

All lenses will transmit through the lens to the film the volume of light equal to the aperture setting only when that lens is focused at infinity. Lenses transmit less light as they are focused down to their closest focusing distance. The reason for this is as lenses get longer they magnify, moving all of the elements further away from the film plane, resulting in light loss.

Note: The lens Barrel Extension light loss for any given focal length lens is approximately the same for all manufacturers.

• Telephoto lenses lose about one half (.5) of a stop. Note: the Hasselblad 150mm will lose .47 and the 180mm will lose .56 of a stop.

• Normal and Wide angle lenses lose about one third (.3) of a stop. Note: the 80mm light loss = .26, the 60mm light loss = .23 and the 50mm light loss = .30.

• Physical - Main Light angle of incidence loss equals .1 to .2, see figure (2):

By definition, the Main Light is not on camera axis and some of the light after striking the subject is lost due to the "Angle of Incidence" and never reaches the film. The amount lost is about .1 to .2 of a stop. The more the Main Light is moved off camera axis the greater the loss, i.e., you lose more light with the Rembrandt lighting pattern then butterfly.

• Physical - Fill Light Angle of Incidence equals no loss, see figure (3):

The Fill Light is on camera axis and the angle of incidence is 180 degrees to the angle of reflectance so, the film receives 99.9999% of the energy from the Fill Light. Nothing lost.

• Variable – Light meter Calibration:

Your light meter's calibration is another unknown. This gray card test will allow for any small mis calibration of your light meter.

• Variable - Film Speed:

First, allow me to say that the film speed of the older Fuji NPS 160 and Kodak VPS-III 160 films were a true ASA 160. Yet, to get the perfect negative we must measure and allow for the physical losses and variables mentioned above. The total light loss equals approximately 2/3 (.666) of a stop, which moves your ASA from 160 to 100.

Now let's look at the new films from Kodak NC/VC 160 and Fuji NPC 160:

The new films still have ASA 160 displayed on the box, but gray card tests indicate a film speed of 250 - Yes! The densitometer doesn't lie; the new 160 films are really ASA 250, 2/3 of a stop faster. Therefore, if we allow for the 2/3 (.666) of stop physical losses mentioned above, we must expose these new films at ASA 160, **i.e., ASA 250 - 2/3 of a stop = 160**

Note: Each step on your light meter's ASA scale (250 to 200 to 160 to 120 to 100 to 80) equals 1/3 (.3) of a stop.

Gray Card Test Procedures, see figure (4):

1. Obtain an 18% reflective 8x10 Kodak Gray Card and cut it down to 6 x 6 inches. This will force the densitometer operator to place the densitometer's measuring probe in the center (same portion) of the gray card on each negative.You can purchase one in most photography stores.

2. Prop up the Gray card on a posing table facing the camera's position and shift it approximately 2 degrees towards the Main Light.

FIGURE 1

Hasselblad Exposure Compensation Information

The need for exposure corrections at the minimum focus settings on photographic lenses is caused by the differences in film illumination between the infinity setting and the closest focusing point of an individual lens. In other words, this exposure compensation is made necessary due to the barrel extension (same as bellows extension) that exists when the lens is focused to its minimum focus setting. Another way of stating this is that the light loss which occurs when the lens barrel lengthens is similar to what happens when an extension tube is used, but to a lesser degree. In some cases, it is not necessary to factor this loss into the exposure setting on the lens. However, on some lenses it can be as much as half stop or more and a correction should be made. The illumination decrease theoretically begins as soon as any extension is made. Therefore, at midpoint in the extension the correction is approximately half of what it will be at the minimum focusing point.

The following is a list of exposure corrections for Zeiss lenses made for Hasselblad:

CF Lenses:			Light loss at closest focusing point.
30mm	F-Distagon	f/3.5	+ 0.18
38mm	Biogon	f/4.5	+ 0.58
40mm	Distagon	f/4.0 FLE	+ 0.16
50mm	Distagon	f/4.0	+ 0.27
50mm	Distagon	f/4.0 FLE	+ 0.30
60mm	Distagon	f/3.5	+ 0.23
80mm	Planar	f/2.8	+ 0.26
100mm	Planar	f/3.5	+ 0.37
120mm	Makro-Planar	f/4.0	+ 0.54
135mm	Makro-Planar	f/5.6	+ 0.35 (Variable ext. tube)
150mm	Sonnar	f/4.0	+ 0.47
180mm	Sonnar	f/4.0	+ 0.56
250mm	Sonnar	f/5.6	+ 0.54
250mm	Sonnar Supper-achromat	f/5.6	+ 0.50
350mm	Tele-Tessar	f/5.6	+ 0.55
500mm	Tele-Apotessar	f/8.0	+ 0.19
140-280mm	Varigon	f/5.6	+ 0.00 (at all focal lengths)
F Lenses:			
50mm	Distagon	f/2.8	+ 0.68
80mm	Planar	f/2.8	+ 0.46
110mm	Planar	f/2.0	+ 0.58
150mm	Sonnar	f/2.8	+ 0.60
250mm	Tele-Tessar	f/4.0	+ 0.67
350mm	Tele-Tessar	f/4.0	+ 0.35

3. Mount your portrait lens on your camera. If you normally use a skylight filter to protect the front element of your lens, make sure it is attached for this test.

4. Load a 120 roll of Fuji NPC 160 or Kodak Portra NC/VC160 film into your film magazine.

5. Make sure you move your camera as close as you can to the gray card while maintaining good focus. This will insure the most light loss (worst case).

6. Position a feathered Main Light at about a 40-degree angle off camera axis, at its normal working distance.

7. Position a Fill Light on camera axis at its normal working distance.

8. Position a Background Light at it normal working distance.

9. Set your lens to f/11.0, which will equal the **total** amount of light on the highlight side of the subjects' face (i.e. f/8.5 main + f/5.6 fill = f/11.0) ***Note: Your lens remains at f/11.0 for the entire test.***

10. Adjust your incident light meter's ASA to 250.

The next series of steps will be repeated several times, readjusting your light meter's ASA and the intensity of Main, Fill and Background Lights each time, for steps (11) through (21), see figure (5).

Write down the light meter's current ASA setting on a 2 x 2-inch piece of white paper and attach it to the upper right hand corner of the gray card with a paperclip.

11. Turn off all room lights and strobes.

12. Power on the **Main Light.** With modeling light on adjust the intensity of this strobe to f/8.5. This is accomplished by pointing your incident light meter (dome attached) directly towards the Main Light from the gray card position.

13. Power off the Main Light.

14. Power on the **Fill Light.** With the modeling light on, adjust the strobe intensity to f/5.6. This is accomplished by pointing your incident light meter (dome attached) directly towards the Fill Light from the gray card's position.

15. Power off the Fill Light.

16. Power on the **Background Light**. With the modeling light on, adjust the strobe intensity to f/5.6. This is accomplished by pointing your incident light meter (dome attached) directly towards the background light from the background's position.

17. Power on all three lights and switch their modeling lights on.

18. Now, while looking through the lens, make sure that there is no glare on the gray card caused by modeling lights. If needed, adjust the gray card horizontally one or two more degrees towards the Main Light to eliminate any glare.

FIGURE #2

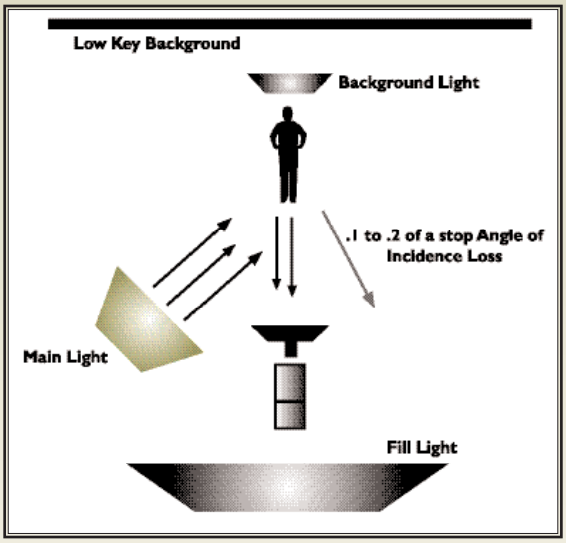


FIGURE #3

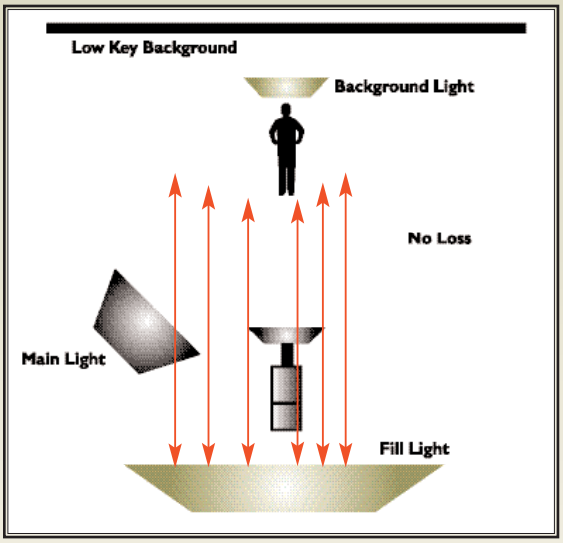


FIGURE #4

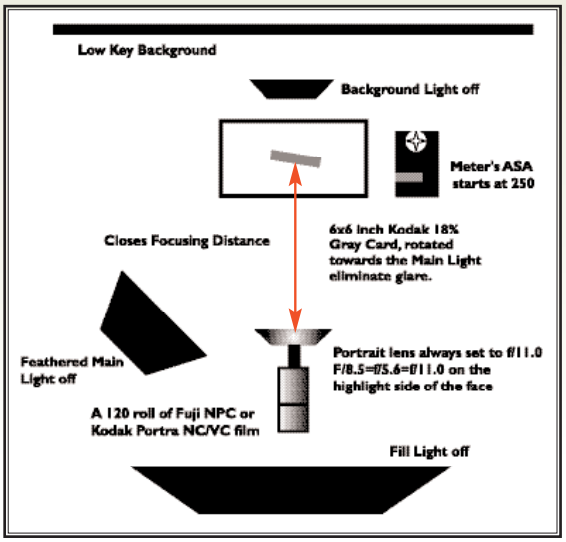
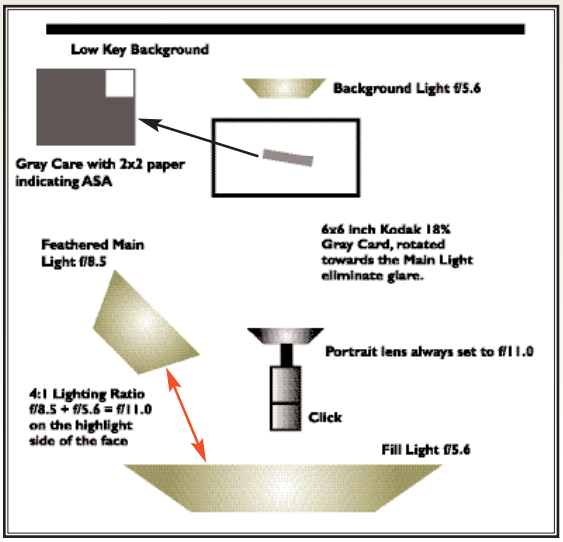


FIGURE #5



19. Make an exposure.

20. Have you photographed the gray card at ASA 250 down through and including 80?

21. No! Adjust your light meter's ASA down to measure .3 of a stop more light, i.e., adjust from ASA 250 to 200 to 160 to 120 to 100 to 80, etc. Loop back and re-execute steps 11 through 21.

• **Yes!** You have now completed the photography section. Send the film to your lab. Mark the job, "Gray Card Test Process Only" and request the lab to do the following:

• Process the film only • Do not cut negatives • Do not print

• Select ***transmission mode*** on a densitometer and dial in the ***Status - M*** red filter.

• Read and record the ***d-min*** (density minimum) in between two negatives.

• Read and record the density, at the center of the gray card found in each negative.

22. When you receive the film back from the lab do the following, see figure (6): Note the d-min value you received from the lab. The d-min value for Fuji should be .20 to .28 and Kodak is .12 to .20.

• Add to this d-min value .65 • Example! Fuji films d-min = .24 + .65 = **target** of .89 • Example! Kodak films d-min = .16 + .65 = **target** of .81 • Use this target density to locate the correct negative, which in turn indicates the correct ASA.

Note: You are looking for the negative which has the lowest gray card density equal to or greater than the target density, i.e., .89 or .81.

Let's say that you are conducting this test with Fuji NPC 160 film and the third density on the list, **see figure (6)**, meets the target criteria, which points to the third negative on the roll, **see figure (7)**. This negative contains the correct ASA 160, as indicated on the 2 x 2-inch paper attached to that Gray card. This is the ASA to use with **your light meter and your lab.**

If the target density cannot be found on the list, it means that your light meter is way out of calibration. Send your light meter to the manufacturer for calibration and redo this procedure.

23. Redo this test when you:

• Purchase a new light meter • Have your light meter re-calibrated • Change the lab that processes your negatives.

Studio Exposure:

Now that you have the correct ASA for your light meter, please follow these easy steps to create the perfect negative:

• Set your light meter's ASA equal to the ASA obtained from the "Gray Card Test.

• Choose a working aperture and set your lens to this f/stop. For our discussion, let us use f/11.0.

• Feather your Main Light, towards the camera and adjust the intensity to f/8.5.

• Adjust the Fill Light intensity to f/5.6, this is a one and one half stop weaker than the Main Light, a 4:1 lighting ratio. Both new films look great at a 4:1 lighting ratio.

• Congratulations you now have the Perfect Negative.

• The perfect negative will yield a portrait with exceptional skin tones, tonal range and color saturation, **see figure (8).**

I hope you found this article both interesting and informative. If you have questions and/or comments, please contact me at: dispensa@bestweb.net.

"When a student is ready to learn a teacher will appear"
~ Author Unknown

"When a teacher is ready to learn he will surround himself with students"
~ Frank J. Dispensa

FIGURE #6

GRAY CARD TEST LAB RESULTS

The d-min of your Fuji 160 = .24
Let's locate the target negative.
.24 + .65 = .89 target.

Remember you are looking for the negative, which has the lowest gray card density equal to or greater than the target density.

NEG.#	DENSITY
01	.77
02	.84
03	.91 Target
04	.95
05	.104

FIGURE #7

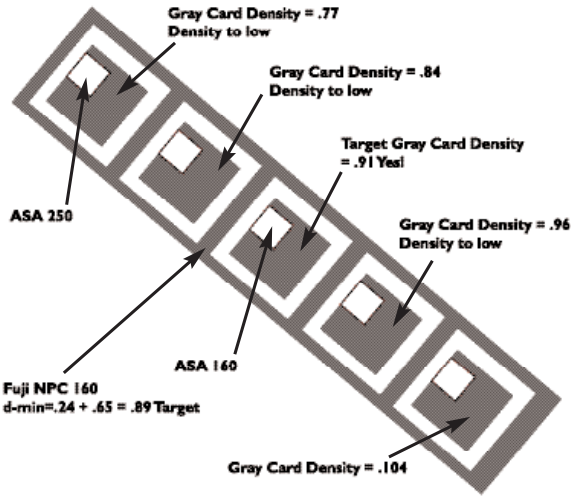


FIGURE #8