

Better Light ViewFinder™ Repro Curves

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Introduction

What are the target RGB exposure values for the white point, black point and a midtone gray? This is one of the most asked questions from digital photographers. Most often, the answer is an unsatisfying “it depends”. The target values will depend on many factors, including the tone curve in effect, the exposure, the intended image contrast, the amount of highlight or shadow detail and the photographer’s unique “look”. However, for fine art reproduction, where the intent is to as closely reproduce the original artwork as possible, RGB target values can be specified.

By measuring several commercially available gray scales, the ColorChecker and ColorChecker DC from Gretag-Macbeth, and the Q-13 and Q-14 Gray Scales from Kodak, with a spectrophotometer and performing some calculations, the Repro curves were created as a tool for successful digital scanning.

These curves were designed for reproduction where the RGB values on a calibrated display will have a **direct correlation to the reflectances of the original items**. If you are going to use the images for publications where details in the highlights or shadows need to be emphasized, or when you want a “certain look”, then you may want to use one of the other curves supplied with the ViewFinder software.

Using the Repro curves will assure an accurate reproduction of the full tone scale and minimize the need and importance of making subjective decisions on tone from the monitor preview. Since the exposure is made objectively by numeric values, the Repro curves can be used with LCD screens in a “by the numbers” reproduction situation, something that is extremely difficult with LCD panels due to the change in color and contrast encountered by the viewer by changing their viewing position.

When the Repro curves are used with a color management profile, a complete “by the numbers” system can be created for highly accurate and rapid color reproduction.

Normal Use

To use these curves, begin by selecting the one that matches the gamma curve for your monitor. Note, these curves assume your monitor has been calibrated to either a 1.8 or a 2.2 gamma value (do not judge the quality of the preview image unless you have a calibrated monitor).

1. Place either a ColorChecker, ColorChecker DC or a Kodak Q-13 (or Q-14) Grayscale in the image area.
2. Make a prescan of your set. For the highest color accuracy, **do not use the Fast Prescan option**.
3. Using the spot meter tool, select the white patch on the reference.
4. Adjust the exposure using the line time, ISO and brightness buttons on the Tone panel until the spot meter **green channel** values of the white patch match the values below.
5. Select several gray patches on the prescan reference image with the spot meter tool. You may need to delete the spot on the white patch or use Command-M to clear all the spots.
6. Select the vertical only adjustment button on the Tone tab panel. This is the button with the up and down pointing arrows.

7. Adjust each of the tone curve control points until all the spot meter **green channel** values match the values in the tables for the selected gray patches and your reference. The spot meter locations can be individually clicked and deleted or all spots cleared using Control-M. Replace the spots on any additional gray patches until all the patches have been adjusted to the table values.

IMPORTANT NOTE: Do not move any of the control points horizontally on the graph. This will upset the tone relationships and make the table values useless!

8. Save the edited curve with a new name for later use.

The brightness of images on the preview should match to the brightnesses of the originals!

Diffuse or Polarized Lighting

The Repro curves were created using reflectance measurements from a specular light source. Illuminating the patches with diffuse lighting, for example fluorescent lighting, will reduce the image contrast by adding a small amount of flare to the patches, making the RGB values higher than expected. If you are using diffuse lighting, then you may need to slightly adjust the curves to achieve the correct RGB values listed in the tables.

It is also a common practice to use double polarization for reflection control in reproducing glossy paintings such as oils and acrylics. The polarizers will change the tone range of the gray references and the Repro curves must be adjusted to the correct values in the same way as for diffuse lighting.

ColorChecker			
Identifier	Reflectance	RGB Value for Gamma	
		1.8	2.2
White	90.01	241	243
N8	59.10	190	201
N6.5	36.20	145	161
N5	19.77	104	122
N3.5	9.00	67	85
Black	3.10	37	53

ColorChecker DC			
Identifier	Reflectance	RGB Value for Gamma	
		1.8	2.2
J6,J7,K6,K7	90.01	241	243
I5	84.19	232	236
Edge White	78.66	223	229
J5	63.63	198	208
K5	50.68	175	187
L5	43.06	160	174
I6	33.04	138	154
L6	24.58	117	135
Edge Gray	19.77	104	122
I7	17.60	97	116
L7	12.00	79	97
I8	7.71	61	80
J8	4.61	46	63
K8	3.82	42	58
Edge Black	3.10	37	53
L8	3.10	37	53

Q-13, Q-14			
Identifier	Reflectance	RGB Value for Gamma	
		1.8	2.2
0 (A)	89.13	239	242
1	79.43	224	230
2	63.10	197	207
3	50.12	174	186
4	39.81	153	168
5	31.62	135	151
6	25.12	118	136
7 (M)	19.95	104	123
8	15.85	92	110
9	12.59	81	99
10	10.00	71	90
11	7.94	62	81
12	6.31	55	73
13	5.01	48	65
14	3.98	43	59
15	3.16	37	53
16 (B)	2.51	33	48
17	2.00	29	43
18	1.58	26	39
19	1.26	22	35

Note: These RGB values were derived from the theoretical reflectances for the chart. Your chart will probably have slightly different values, so getting the exposure to within 1 or 2 RGB units is all that is necessary, if the average difference for the dark, midtone and highlight values sums to 0 (or very close to it).