

# Better Light ViewFinder™ Repro Curves

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## Introduction

What are the ideal RGB exposure values for the white point, black point and a midtone gray? This is one of the most frequently asked questions from digital photographers. Most often, the answer is an unsatisfying “it depends”. The target values will depend on many factors, including the active tone curve, 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 reproduce the original artwork as accurately possible, RGB target values can be specified.

By measuring several commercially available gray scales; the ColorChecker®, ColorChecker® Passport, ColorChecker® SG, or the ColorChecker® DC from X-Rite, 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 about tonality 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 when changing their viewing position.

How you use the Repro curves will depend on whether you are using software that compensates for lighting and lens intensity falloff, or not. Each method is outlined below. Use only the one that conforms to your workflow.

## Using the Repro Curves without Falloff Compensation

Begin by selecting the Repro curve that matches the gamma 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. Position the camera in your copy setup so the size of your color chart is no more than 25% of the image area.
2. Make a prescan of a clean white board (e.g. Foamcore™).
3. Activate the ToneZones™ feature in ViewFinder.
4. Adjust the lights until a chart-sized area of the preview is evenly lit to within 2 RGB units, or less. This may require setting up a custom set of zones. The camera may need to be moved back even more from the copyboard to produce an evenly lit, chart-sized area, usually in the middle of the lens. Often the chart-sized area is only 1/4 or less of the image height or width.
5. Place either a ColorChecker, ColorChecker Passport, ColorChecker SG, ColorChecker DC or a Kodak Q-13 (or Q-14) Grayscale in the evenly lit image area.
6. Make a prescan of your color chart. For the highest color accuracy, **do not use the Fast Prescan option**.
7. Using the spot meter tool, select the white patch on the reference.
8. Adjust the exposure using the Line Time, ISO and Neutral values on the Color panel until the spot meter **green**

**channel** values of the white patch match the values in the attached chart. If necessary, change the camera lens aperture and make a new prescan. **Do not change the lights!**

9. Capture an image of your chart at the size recommended for your profiling software. Do not forget to digitally remove any defects in the patches before putting the image through your profiler.

10. Create an ICC profile according to the instructions that came with your profiling software.

11. Reposition the camera for the artwork scan. This will require realigning the camera with your Zig-Align™ or other alignment device.

12. Continue with your regular reproduction workflow.

### **Using the Repro Curves with Falloff Compensation**

Begin by selecting the Repro curve that matches the gamma 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. Position the camera and lights in your copy setup for the size of the artwork to be photographed.

2. Place either a ColorChecker, ColorChecker SG, ColorChecker DC or a Kodak Q-13 (or Q-14) Grayscale in the evenly lit image area.

3. Make a prescan of your color chart. For the highest color accuracy, **do not use the Fast Prescan option.**

4. Using the spot meter tool, select the white patch on the reference.

5. Adjust the exposure using the Line Time, ISO and Neutral values on the Color panel until the spot meter **green channel** values of the white patch match the values in the attached chart.

6. Capture an image of your chart at the size recommended for your profiling software. Do not forget to digitally remove any defects in the patches before putting the image through your profiler.

7. Use your falloff compensation software to create an evenly toned color chart image. This may require capturing a second image of a white or gray material that covers the image area. Consult your falloff compensation software's manual for the details.

8. Create an ICC profile according to the instructions that came with your profiling software.

9. Continue with your regular reproduction workflow.

## Contrast Adjustment

After the profile is created and applied in ViewFinder, you may find the preview image to be slightly less contrasty than desired. To increase the contrast slightly, use the following procedure.

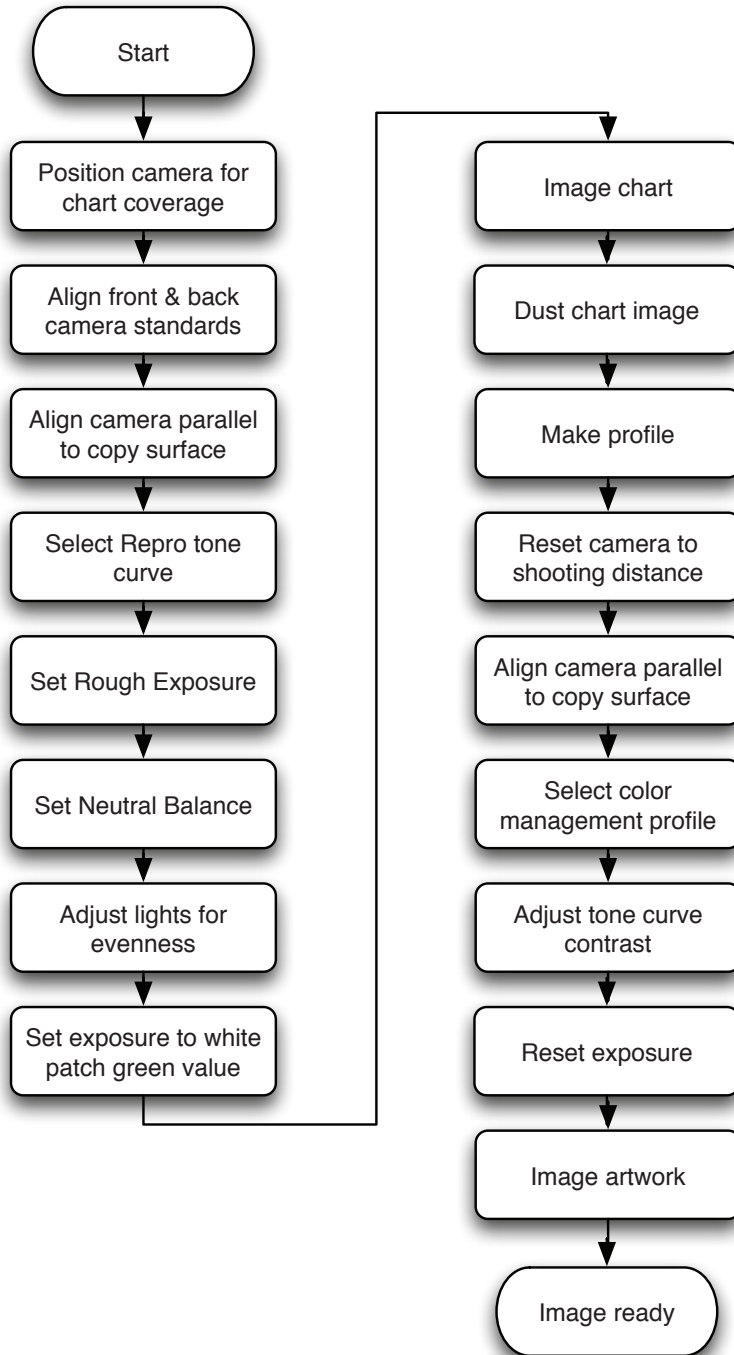
With a prescan image of the color target in the ViewFinder preview, clear the spot meters, then put a spot in the white patch on the color chart. In the Tone panel, click and drag the zero point in the scale at the bottom of the graph until the zero point is at the same point as the white patch (the RGB number on the left side of the tone graph will be the same value as the white patch in attached chart).

Holding down the Option key (Alt key on Windows), click **once** on the Increase Contrast button. This will cause the graph to rotate slightly about the zero point. The effect will be to increase the contrast slightly without burning out any highlight details. Then make a new setting for this curve. It is recommended to name the curve with some indication that this is the modified Repro curve but with one extra click of contrast (e.g. Fred repro+1con).

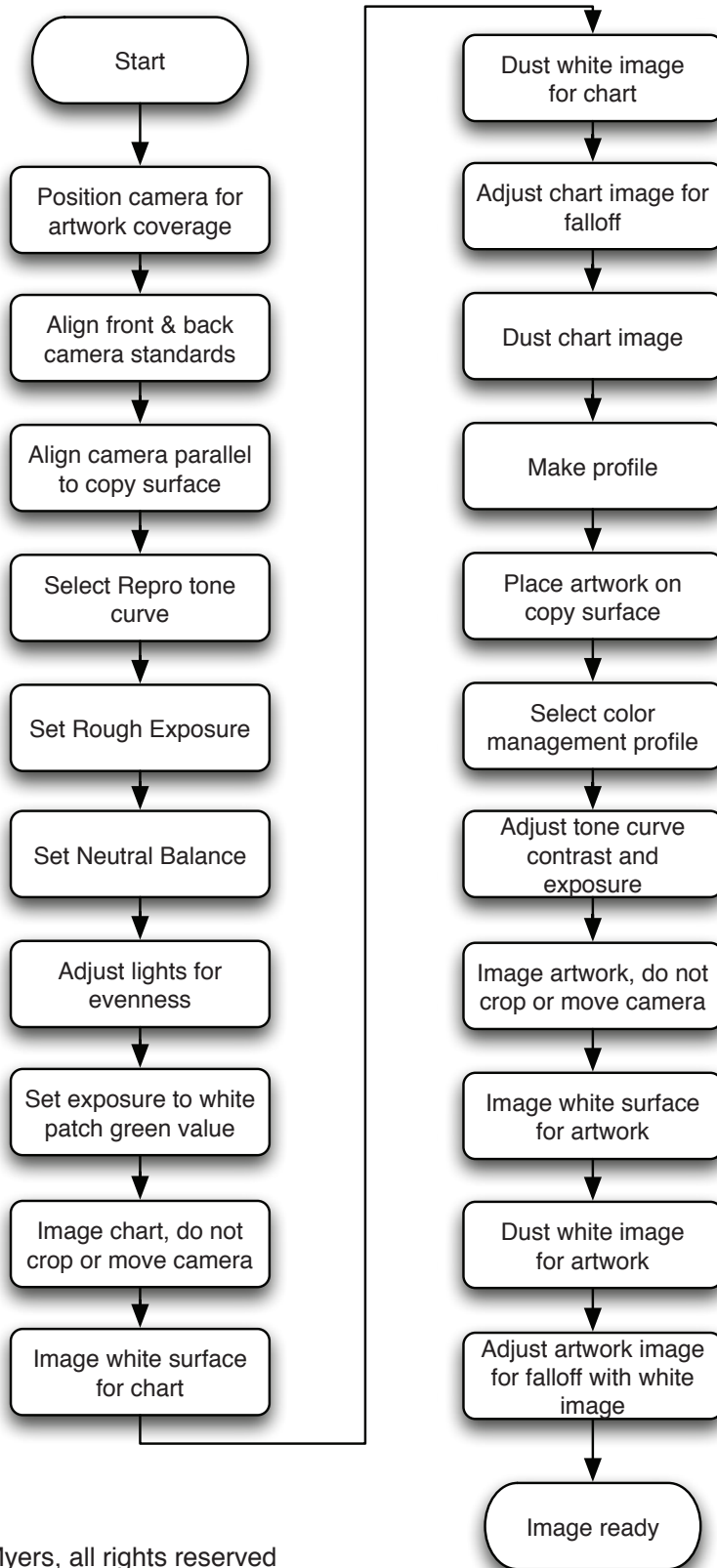
Then hold down the Option key (Alt key on Windows) and **click once again** on the Increase Contrast button. Make a new setting for this curve, indicating that this curve has 2 clicks of contrast (e.g. Fred repro+2con)

To use these modified curves, prescan the artwork with the profile applied, then select either the one-click or the two-click curves to increase the contrast to achieve the desired result. This is a “season to taste” adjustment. It often depends on the artwork as to which curve will be preferred.

# Art Reproduction Workflow Without Falloff Compensation



# Art Reproduction Workflow With Falloff Compensation



## Repro Curve Values

<b>ColorChecker Classic</b>	<b>ColorChecker Passport</b>	<b>ColorChecker SG</b>
Repro Curve 1.8    2.2	Repro Curve 1.8    2.2	Repro Curve 1.8    2.2
White            241    243	<i>White Balance</i> 190    201	E5/Outer White    243    245
N8                190    201		J6                    217    223
N6.5            145    161	<i>Photo Enhancement</i>	F5                    184    195
N5                104    122	Light Clipping 4    241    243	I6                    175    187
N3.5            67     85	Light Clipping 3    215    222	K6                    157    172
Black            37     53	Light Clipping 2    190    201	G5                    140    156
	Light Clipping 1    167    181	H6                    127    144
	Dark Clipping 4    51     68	H5/Outer Gray    100    119
	Dark Clipping 3    46     63	K7                    89     108
	Dark Clipping 2    42     58	G6                    76     95
	Dark Clipping 1    37     53	I5                    65     83
		F6                    56     73
	<i>ColorChecker Classic</i>	K8                    36     52
	White                241    243	J5                    30     44
	N8                    190    201	E6/Outer Black    20     32
	N6.5                145    161	
	N5                    104    122	
	N3.5                67     85	
	Black                37     53	
<b>ColorChecker DC</b>	<b>Kodak Gray Scale</b>	
Repro Curve 1.8    2.2	Repro Curve 1.8    2.2	
Gloss White    244    246	0 (A)                239    242	
JK67            241    243	1                      210    218	
I5                232    236	2                      185    196	
Outer White    223    229	3                      163    177	
J5                198    208	4                      143    159	
K5                175    187	5                      126    143	
L5                160    174	6                      111    129	
I6                138    154	7 (M)                98     116	
L6                117    135	8                      86     105	
Outer Gray    104    122	9                      76     94	
I7                97     116	10                     67     85	
L7                79     97	11                     59     77	
I8                61     80	12                     52     69	
J8                46     63	13                     45     62	
K8                42     58	14                     40     56	
L8/Outer Black 37     53	15                     35     50	
Gloss Black    10     18	16 (B)                31     45	
	17                     27     41	
	18                     24     37	
	19                     21     33	