

# Aardenburg

144



IMAGING & ARCHIVES

*Tested System:*

*ID#:273*

Printer: Epson Stylus Photo 1400

Inks/Colorants: Epson OEM (Claria 79)

Media: Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil)

Coating(s): no additional coating

**Sample #: AaI\_20121030\_SN001**

**Testing Status: 160 Megalux hours total light exposure**

*Testing Is ongoing, next update on approximately DEC 20, 2017*

## Conservation Display Rating (CDR)

*Lower limit:* 13 Megalux hours (for weakest 10% of the color patches)

*Upper limit:* 20 Megalux hours (for average of all the color patches)

Note: a CDR with narrow range (typically less than 2:1) indicates relatively even overall fading of the image. A wide range indicates faster fading in certain local colors/tones prior to general fading of most colors/tones in the entire image. Compare ratings for different systems directly and/or use the table on page 2 to estimate time (years) on display.

\* Please read document AaI\_2009\_0118\_TA-01.pdf, “An Overview of the AaI&A Conservation Display Ratings”, located on the Documents page of the AaI&A website for further explanation of the Conservation display ratings.

This report has been prepared for the exclusive use of members of Aardenburg Imaging & Archives. Members may share this information with other members, friends, colleagues, and individual clients. It may also be distributed to groups for educational purposes (classes, lectures, educational seminars. etc). However, all contents including but not limited to Conservation Display Ratings may not be posted to web sites and may not be reproduced or distributed for corporate research, marketing, or other promotional purposes without written permission from Aardenburg Imaging & Archives.

copyright ©2017

<http://www.aardenburg-imaging.com>

Aardenburg Imaging and Archives  
Rev:8/17/17



## About this Report

This report contains light fastness information about a sample test print produced by a specific digital printing system. “System” refers to all hardware, software, and materials used to make the finished print. The hardware, software, material components, and printmaker’s skills contribute to the final image quality and image permanence. The tested sample is made with current or recently discontinued stocks of commercially available products unless otherwise stated. Each sample has been prepared by Aardenburg Imaging & Archives or one of its members in accordance with customary print making practices unless otherwise noted. The sample may also contain additional finishing materials such as overcoats and laminates which are also noted when used. Finally, the sample has been tested under standardized conditions that are defined on the Sample Description page (see page 4). AaI&A makes every effort to ensure but cannot guarantee that the samples are properly identified and documented and that test results are accurate. For this reason, AaI&A also strives to test independently produced sample replicates in order to increase sampling confidence and to provide information on process variability. Please compare the results in this report to replicate test samples when the data become available.

## Understanding this Report



The magnitude and visual appearance of fading depends not only on the chosen printing system but the chosen image as well. In other words, different images are comprised of different colors, and the fading relationships between those colors dictate how the image will look as it fades. The sample print in this test report was made by reproducing the digital image shown on the left. It contains 30 standard colors. 24 of the colors are colorimetrically matched to the Macbeth ColorChecker™ chart viewed under D50 illumination. The remaining six colors supplement the ColorChecker™ array with four additional skin tone colors, one patch for paper white, and another for maximum black. The additional colors also round out the distribution of CIELAB L\* (lightness) values in the test target.

Information about the fading characteristics of the product is provided in three ways:

**1) You can visually assess the fading.** The target images reproduced in this report are digitally reconstructed from the spectrally measured color data rather than scanning or otherwise reproducing the physical print by conventional techniques. This method ensures a colorimetrically accurate representation of the print appearance as the print fades. A calibrated monitor is recommended to experience the best possible reproduction of the test sample appearance. The side-by-side “before and after” presentation of the target images simulates looking at a perfect copy of the unexposed original print along side the same print after light exposure. You can also use Adobe Reader’s full screen mode to cycle through the pages and “animate” the fading.

**2) I\* Color and tonal accuracy scores are reported.** This report includes I\* metric scores that compare the color and tonal relationships of the light exposed samples to the color and tonal relationships existing in the original print prior to light exposure. Perfect I\* scores of 100% can be approached when no significant fading occurs. Average scores above 90% generally indicate excellent retention of original quality, 80% good, 70% fair, etc., but your conclusions may vary depending on your image quality requirements. I\* color rates the retained color accuracy (hue and chroma) while I\* tone rates the retained tonal accuracy (lightness and contrast). The score is on a percentile scale where 100% is a perfect match between the comparison image (e.g., “after” light exposure) and the reference image (e.g., “before” any light exposure). 0% I\* color means no color accuracy is left. 0% I\* tone means essentially no tonality remains and all image information content is lost. Negative I\* values have significance as well and contribute to the average I\* score when they occur. Negative I\* color values mean false color has occurred, for example, when a skin tone turns green or a neutral gray becomes distinctly colorful. Negative I\* tone scores mean visual contrast between colors has become inverted (i.e., like the tonal relationships in a photographic film negative). Serious image quality problems must arise before false colors and/or tones appear. For more information on the I\* metric, please refer to the AaI&A web site.

**3) Color changes are also reported using the classic color difference model,  $\Delta E$ .** Note that  $\Delta E$  values lose perceptual scaling significance when they become large (e.g., > 15). Also, the  $\Delta E$  equation does not unambiguously measure changes in image contrast. This limitation is generally not a problem for paints and textiles, but can be a serious oversight when evaluating photographic images. Properly tracking changes in image contrast was a major reason behind the development of the I\* metric.

Table to Convert Megalux-hours of Light Exposure to estimated “Years on Display” Light Fastness Ratings.												
Indoor Light Levels for Print Display		Multiply Mlux-hrs by	Megalux-hours in test									
Light Exposure	Description		10	20	30	40	50	60	70	80	90	100
≤ 10 Lux 24 hours per day	Interior rooms, storage areas, or hallways without windows, illuminated sparingly by artificial lighting	11.42	114	228	342	457	571	685	799	913	1027	1142
50 Lux 12 hours per day	“Museum Standard” display condition	4.57	46	91	137	183	228	274	325	365	411	457
120 Lux 12 hours per day “Kodak Display Years” (1)	Average home illumination level for photos is ~ 60 lux. 90% of all displayed photos do not exceed 120 lux (1).	1.90	19	38	57	76	95	114	133	152	171	190
228 Lux 12 hours per day	Relatively bright home or office. Note the simple 1:1 relationship between “years on display” and Mlux-hr values at this condition.	1.00	10	20	30	40	50	60	70	80	90	100
450 Lux 12 hours per day “WIR Display Years” (2)  Also equals 500 lux for 11.8 hours per day	A bright home or commercial office building illumination level is 200-500 lux. Also, good illumination for color critical viewing and color matching tasks begins at about 500 lux.	0.51	5	10	15	20	25	30	35	41	46	51
2000 Lux 12 hours per day	Commercial Gallery. Also, critical color evaluation standards call for 2000 lux and a D50 illumination source.	0.114	1.1	2.3	3.4	4.6	5.7	6.8	8.0	9.1	10.3	11.4
5000 Lux 12 hours per day	E.g., Sunlight through a window striking print at an angle.	0.046	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.7	4.1	4.6
10,000 Lux 12 hours per day	South-facing window in U.S.A. , e.g., storefront display with photos directly facing window.	0.023	0.2	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.1	2.3

Light levels commonly encountered in the real world fluctuate widely throughout indoor print display environments and produce large variations in how long it takes for artwork to acquire light-induced damage. Use this table as a guide to estimate how many “years on display” (denoted in red text) it takes to accumulate an equivalent light exposure dosage. Review the test results to decide which Megalux-hour dose has caused fading to your level of concern (e.g., just noticeable, easily noticeable, objectionable, etc.). Then choose the “Light Exposure” description that best represents how your print is likely to be displayed. You may want to obtain a lux meter and make some measurements in your own display environment!

Note that as the years of display time increase, light-induced fading can be eclipsed by other serious aging mechanisms such as fading and/or staining caused by heat, humidity, and air pollutants. Mould damage can also occur at high humidity. Even when colorants remain water fast, direct contact with liquids may result in physical deformation and staining of the substrate. Also, temperature and especially strong seasonal humidity fluctuations can cause physical cracks and/or flaking, etc., over time. Handling damage such as scratching, abrasion, tears and creases, and catastrophic damage by smoke, fire, flood, etc., also destroy print quality over time. Thus, as illumination levels are reduced other forms of print degradation take on greater probability of occurrence.

(1) Eastman Kodak cited this exposure condition with a 90% confidence limit as a rationale for estimating print fading times of traditional color photo materials in typical home display environments. However, for light fading claims regarding its line of pigment-based inkjet printers, Kodak adopted the higher level of 450lux/12 hours per day which is also used by Wilhelm Imaging Research, Inc. (See below).

(2) Wilhelm Imaging Research (WIR) standardized its light fastness ratings on 450 lux for 12 hours per day in order to estimate the years on display necessary to reach “easily noticeable” fading. This average daily light exposure dosage, at an assumed 75°F/60%RH temperature and humidity level, has become a de facto industry standard for most industry-sponsored predictive “years of life” light fading estimates in the absence of a published International Standards Organization (ISO) test standard. The table above readily shows how much error occurs in such “print lifetime” predictions as actual real world light levels for prints on display routinely deviate above and below the assumed 450 lux intensity value.

# Sample Description

**Sample #** AaI\_20121030\_SN001 **Batch #:** M1  
**Printer:** Epson Stylus Photo 1400  
**Ink:** Epson OEM (Claria 79)  
**Media:** Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil)  
**Coating(s):** no additional coating  
  
**Test Print Prepared by:** AaI&A member  
**Printed:** October 20, 2012  
**Initial Print colors measured** February 17, 2013  
**Test Started:** February 20, 2013  
  
**Test Image:** AaI\_StandardColorSet(v2)forSRGB.tif  
**RIP?Driver settings:** Epson OEM driver (v 6.61), PSCS4, quality = "Photo", high speed = "off", NCA (no color adjustment)  
  
**Media Setting** Epson Ultra Premium Photo Paper Luster  
  
**Profile:** RR UPSatin 2-0 Ep1400 Clria.icc **Rendering** Perceptual  
**Profile type:** generic, provided by media vendor

## Paper White Color (UV-included versus UV-excluded)

<b>Optical Brighteners Present?</b> <i>yes (low)</i>	<b>L*</b>		<b>a*</b>		<b>b*</b>	
<b>Media Whitepoint Color</b>	UV inc	UV exc	UV inc	UV exc	UV inc	UV exc
	94.4	94.5	0.1	-0.4	-4.1	-2.1
	<b>UV-inc/UV-exc <math>\Delta L^*</math>, <math>\Delta a^*</math>, <math>\Delta b^*</math> respectively</b>					
	0.1		0.5		2.0	
	<i>Calculated differences, especially for <math>\Delta b^*</math>, indicate the role and magnitude of fluorescence on original paper color</i>					
<b>Maximum Printed Black</b>	<b>L*</b>	<b>a*</b>	<b>b*</b>	<b>Optical Density (Dmax)</b>		
	4.2	-0.1	-2.9	2.34		

**Light source:** Phillips Colortone F40T12/C50 – 5000°K full spectrum fluorescent. Color rendering Index (CRI) =92), soda lime glass filtered  
**Light Exposure Cycle:** 8 hours on, 4 hours off, twice per 24 hours  
**CIELAB measurements:** D50 2° observer, Xrite Gretag/Macbeth Spectrolino/Spectroscan  
  
**Average Illuminance during "on" cycle:** 10797 Lux  
**Average Temperature:** 24.5°C over full test duration, 25.7°C during light exposure.  
**Average Relative humidity:** 55.8%RH over full test duration, 56.0%RH during light exposure.

**Notes/Comments:****Replicates/Compare to:**

Compare to these other Red River Ultra Pro Satin 2.0 paper samples tested as part of a direct side-by-side light fade test for this paper:

**ID# 275 – sample # AaI\_20121030\_SN003** – printed on the same Epson 1400 printer and batch of paper but uses the MIS Associates D2 “Claria compatible” dyebase ink set.

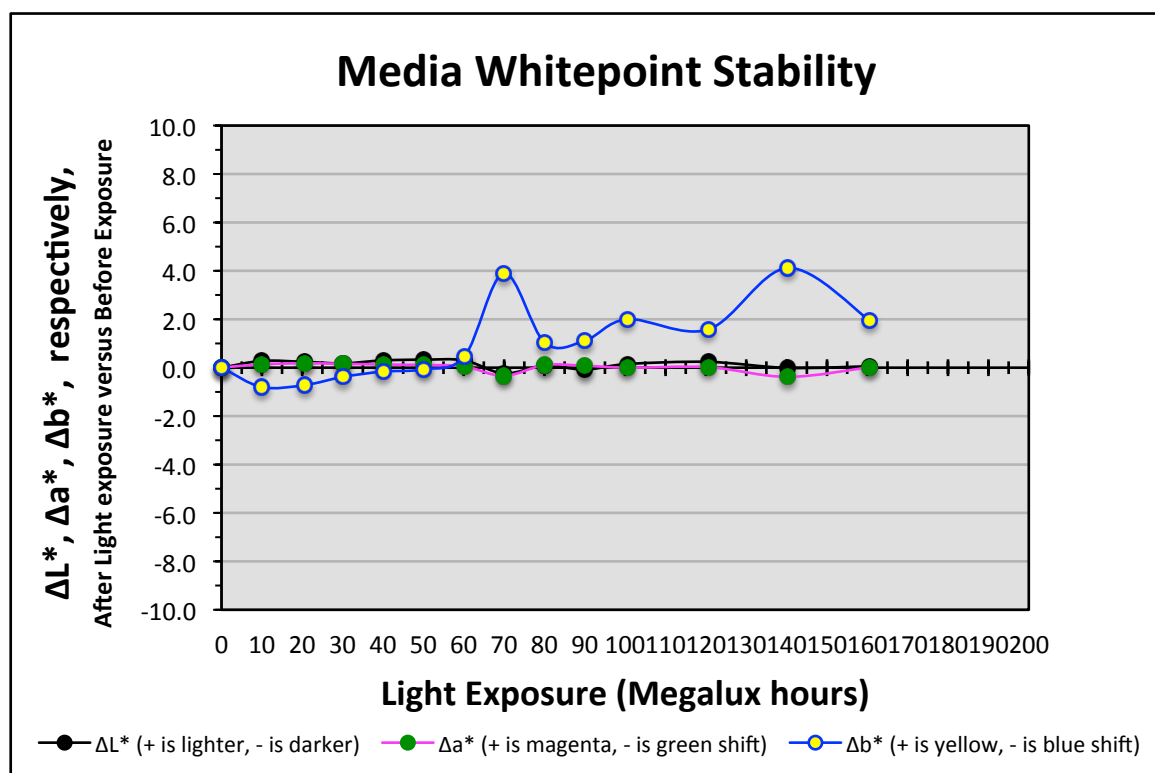
**ID# 276 – AaI\_20121116\_SN001** – printed on an Epson Stylus Pro 7880 using Epson OEM UltraChrome K3™ with Vivid Magenta pigmented ink set.

**ID# 277 – AaI\_20121130\_SN002** – printed on an Epson R3000 using ConeColorPro® pigmented Ink set (for the Epson R3000 printer).

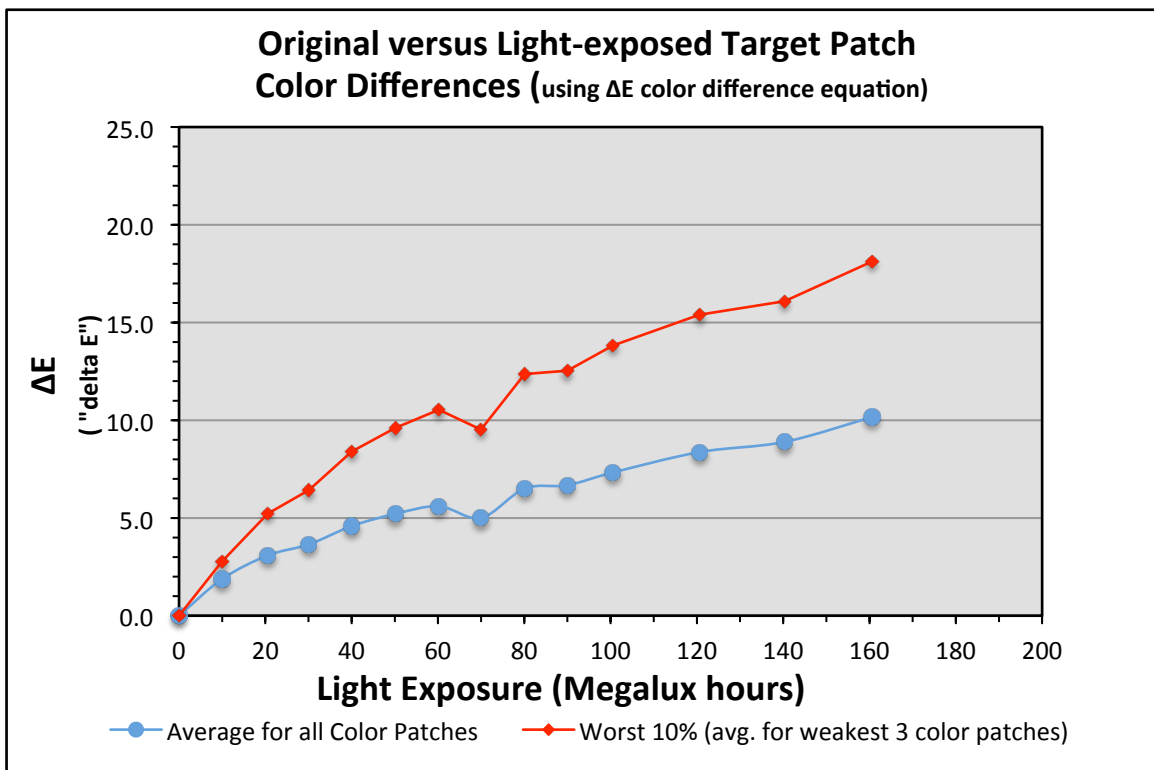
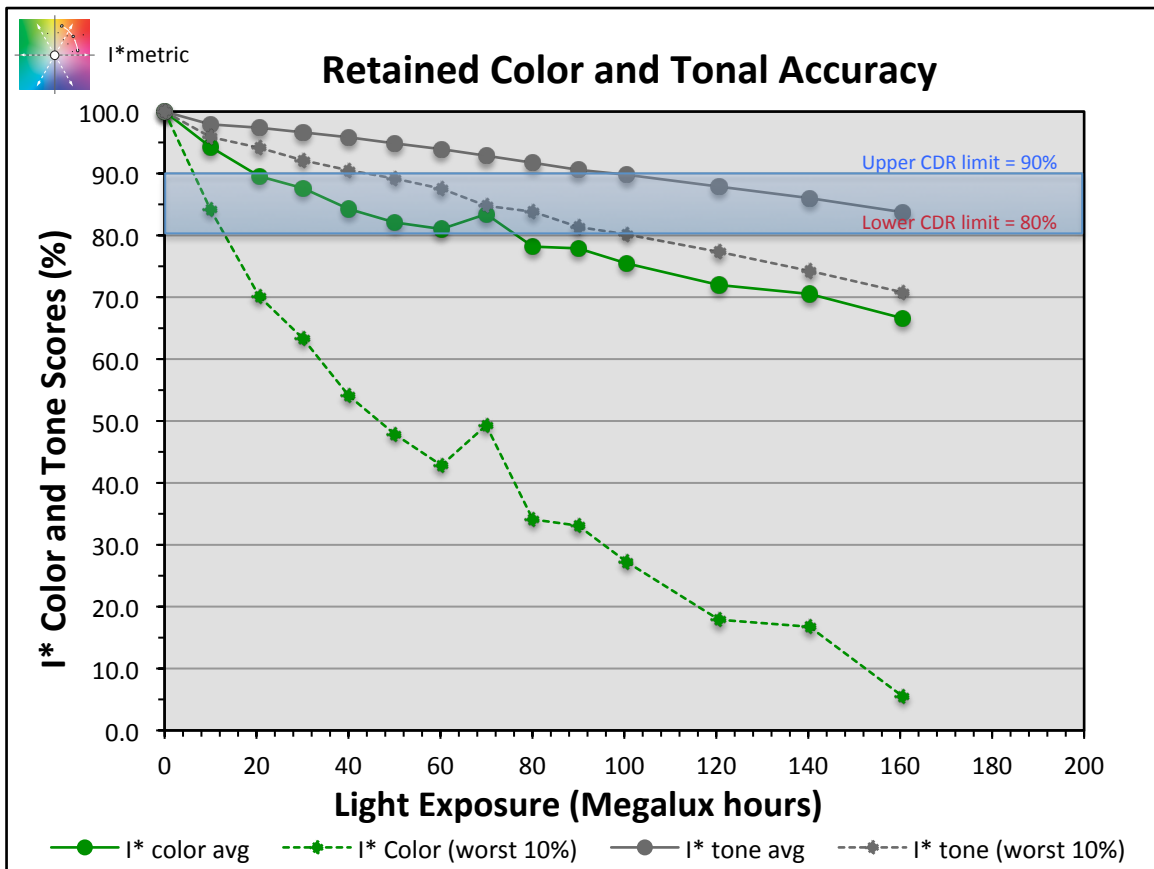
**MHMG 2015-06-07:** The significant jump in  $b^*$  value on the whitepoint stability graphs at 70 Mluxhrs and partial recovery at 80 Mluxhrs were not measurement errors. The 70 Mluxhr measurements was delayed approximately six weeks after removing the sample from the light fade unit. The temporary "dark storage" period caused a phenomenon I call "light-induced low intensity staining (LILIS)". LILIS is additional media yellowing over and above the yellowing caused by loss of fluorescence as the optical brighteners (OBAs) fade. However, it may well be discoloration directly associated with the faded OBA degradation by-products. The widely held assertion that papers simply return to their "natural" color as the OBAs fade is now called into question with the LILIS effect. This additional yellow stain formation can also be partially or fully reversed with more light exposure of sufficient intensity as evidenced by the 80 Mluxhr exposure results which were measured immediately after removal of the sample from the light fade test unit. Unfortunately, the stain will return again with further storage in low intensity or dark storage environments.

**Graphs:**

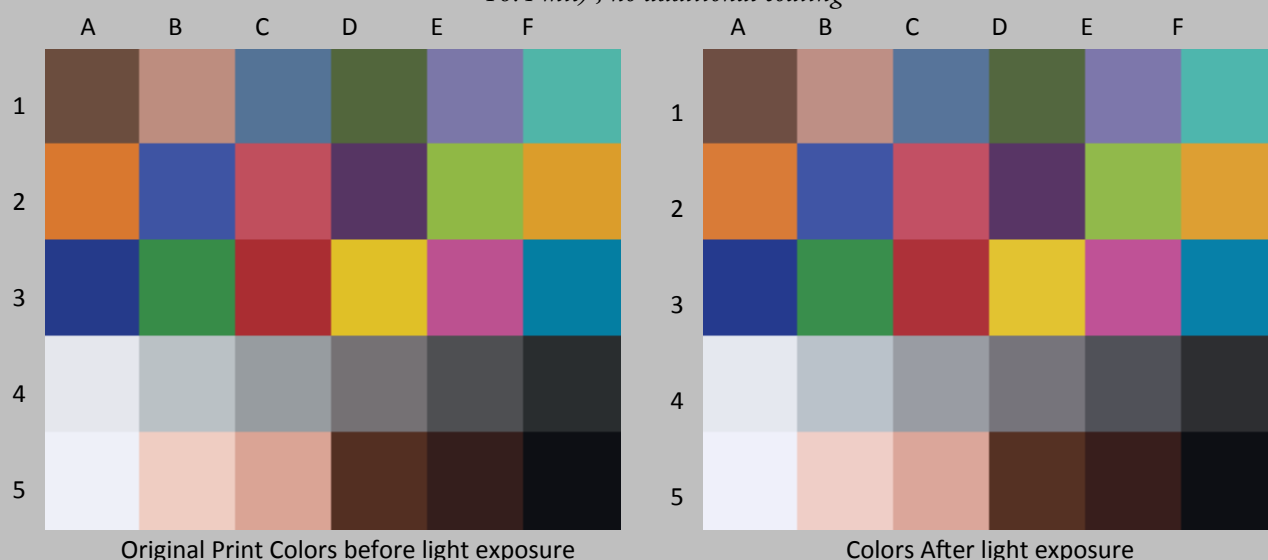
*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



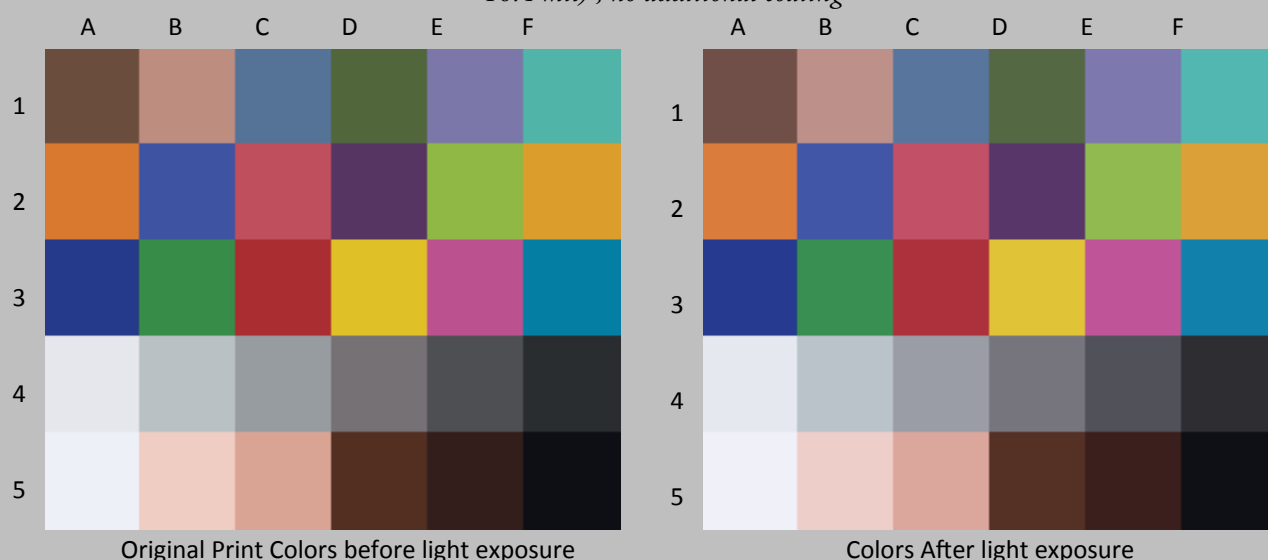
*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	93.1	1.9	35.7	36.4	12.4	12.9	13.5	11.8
B1	Light Skin	91.3	2.5	63.3	63.9	16.6	16.6	15.3	12.8
C1	Blue sky	94.0	2.0	47.2	47.8	-3.7	-2.9	-22.8	-24.5
D1	Foliage	96.7	1.5	40.6	41.3	-14.1	-13.8	20.9	19.6
E1	blue flower	96.0	1.7	51.6	52.3	10.3	10.9	-25.7	-27.2
F1	bluish green	96.7	1.7	67.5	68.0	-33.2	-32.6	-3.4	-4.9
A1	orange	96.9	2.6	61.0	61.7	34.6	34.1	54.5	52.1
B2	purplish blue	98.3	1.4	37.2	37.8	11.0	11.9	-45.9	-46.8
C2	moderate red	94.8	3.2	49.4	50.2	47.5	47.6	16.4	13.3
D2	purple	95.3	2.1	27.7	28.4	22.1	23.1	-20.6	-22.2
E2	yellow green	97.8	1.9	70.1	70.6	-26.9	-27.1	51.8	50.0
F2	orange yellow	97.2	2.5	69.5	70.2	17.2	16.6	64.4	62.1
A3	blue	97.7	1.7	26.6	27.1	14.7	16.0	-48.5	-49.6
B3	green	97.6	1.7	51.9	52.5	-38.5	-38.1	28.5	26.9
C3	red	97.0	2.4	39.7	40.6	50.8	50.8	28.5	26.3
D3	yellow	97.6	2.4	79.0	79.6	1.2	0.6	73.2	71.0
E3	magenta	96.8	2.3	50.6	51.4	49.4	49.6	-12.7	-14.8
F3	cyan	96.0	2.0	48.8	49.3	-19.9	-18.8	-28.3	-29.8
A4	white	95.3	1.0	91.6	91.9	0.0	0.1	-2.9	-3.9
B4	neutral 8	88.9	1.6	77.6	78.0	-1.8	-1.6	-3.1	-4.6
C4	neutral 6.5	85.2	2.0	64.0	64.5	-0.8	-0.4	-2.6	-4.4
D4	neutral 5	81.6	2.3	48.4	49.1	1.5	2.1	-1.4	-3.6
E4	neutral 3.5	85.8	2.0	33.7	34.4	0.2	1.0	-2.1	-3.8
F4	black	91.7	1.5	17.9	18.7	-0.9	0.4	-2.1	-2.3
A5	paper white	96.7	0.9	94.8	95.0	0.4	0.5	-3.8	-4.6
B5	Skin highlight L*=88	92.2	1.7	85.0	85.4	10.8	10.9	9.9	8.2
C5	Skin highlight L* =75	93.2	2.3	72.3	72.9	18.9	18.9	16.3	14.1
D5	Skin shadow L*=28	99.7	1.0	23.8	24.5	15.8	16.4	15.7	15.9
E5	Skin shadow L*=13	88.0	2.3	14.0	15.0	11.5	13.1	6.0	7.2
F5	Maximum Black	100.0	0.4	4.2	4.4	-0.1	0.2	-2.9	-2.8
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>10 Megalux hours</b>				
Average Score for all patches		94.3	97.9	1.9					
Worst 10% (3 lowest scoring patches)		84.2	95.9	2.8					



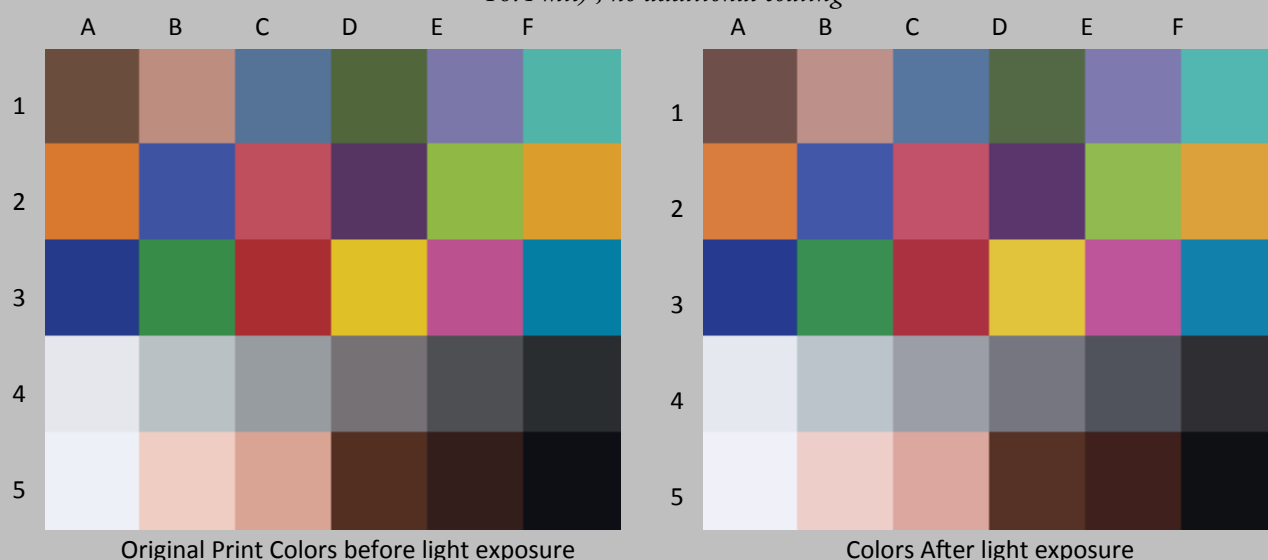
*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	84.8	3.5	35.7	36.7	12.4	12.7	13.5	10.2
B1	Light Skin	84.1	4.2	63.3	64.1	16.6	16.5	15.3	11.2
C1	Blue sky	90.0	3.0	47.2	48.2	-3.7	-2.7	-22.8	-25.4
D1	Foliage	91.3	2.9	40.6	41.6	-14.1	-13.8	20.9	18.2
E1	blue flower	93.9	2.4	51.6	52.6	10.3	10.7	-25.7	-27.9
F1	bluish green	94.4	2.5	67.5	68.2	-33.2	-32.3	-3.4	-5.6
A1	orange	93.4	4.8	61.0	61.9	34.6	33.7	54.5	49.9
B2	purplish blue	97.8	1.8	37.2	38.1	11.0	11.8	-45.9	-47.2
C2	moderate red	89.8	5.7	49.4	50.3	47.5	47.5	16.4	10.8
D2	purple	90.3	3.6	27.7	28.6	22.1	23.4	-20.6	-23.8
E2	yellow green	94.9	3.6	70.1	70.8	-26.9	-27.2	51.8	48.3
F2	orange yellow	93.9	4.6	69.5	70.4	17.2	16.1	64.4	60.0
A3	blue	96.4	2.5	26.6	27.4	14.7	16.3	-48.5	-50.2
B3	green	94.8	3.1	51.9	52.8	-38.5	-38.1	28.5	25.5
C3	red	92.3	5.1	39.7	40.8	50.8	50.5	28.5	23.6
D3	yellow	94.6	4.5	79.0	79.7	1.2	0.2	73.2	68.8
E3	magenta	94.1	3.6	50.6	51.6	49.4	49.4	-12.7	-16.2
F3	cyan	93.7	2.8	48.8	49.7	-19.9	-18.5	-28.3	-30.6
A4	white	95.0	1.0	91.6	91.9	0.0	0.2	-2.9	-3.9
B4	neutral 8	81.8	2.3	77.6	78.1	-1.8	-1.6	-3.1	-5.3
C4	neutral 6.5	74.8	3.0	64.0	64.8	-0.8	-0.4	-2.6	-5.4
D4	neutral 5	65.5	3.9	48.4	49.4	1.5	2.1	-1.4	-5.1
E4	neutral 3.5	70.1	3.5	33.7	34.7	0.2	1.1	-2.1	-5.3
F4	black	85.9	2.1	17.9	19.0	-0.9	0.7	-2.1	-3.1
A5	paper white	97.5	0.8	94.8	95.0	0.4	0.6	-3.8	-4.5
B5	Skin highlight L*=88	86.6	2.5	85.0	85.5	10.8	10.8	9.9	7.4
C5	Skin highlight L* =75	86.8	3.9	72.3	73.1	18.9	18.7	16.3	12.5
D5	Skin shadow L*=28	99.8	1.1	23.8	24.7	15.8	16.1	15.7	15.3
E5	Skin shadow L*=13	78.9	3.7	14.0	15.8	11.5	14.0	6.0	7.9
F5	Maximum Black	100.0	0.6	4.2	4.6	-0.1	0.3	-2.9	-2.6
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>20 Megalux hours</b>				
Average Score for all patches		89.6	97.4	3.1					
Worst 10% (3 lowest scoring patches)		70.1	94.2	5.2					

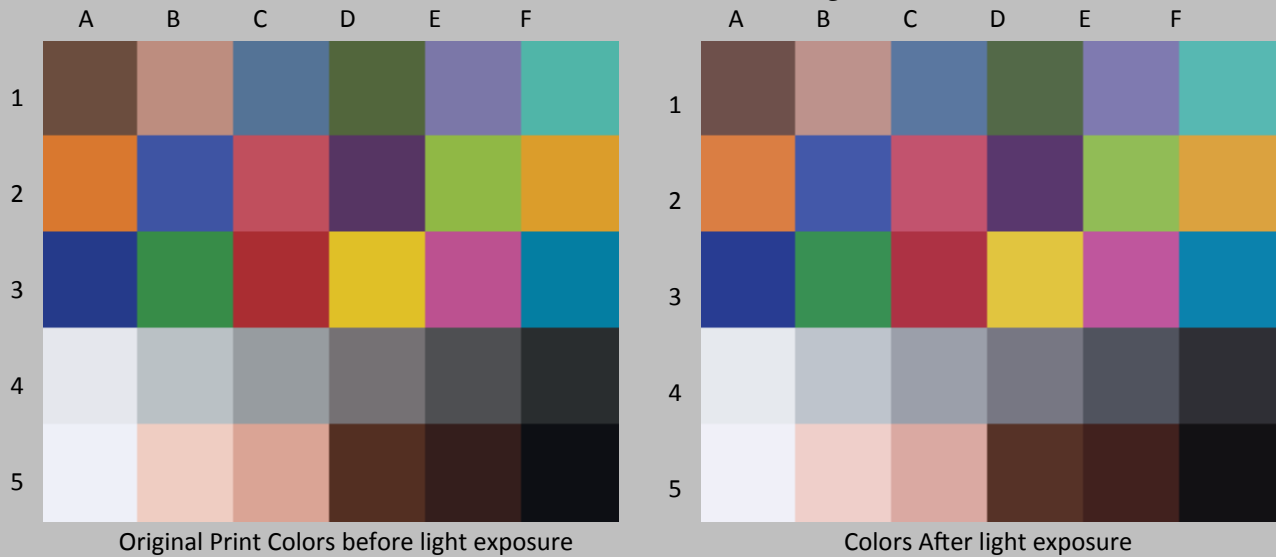


*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



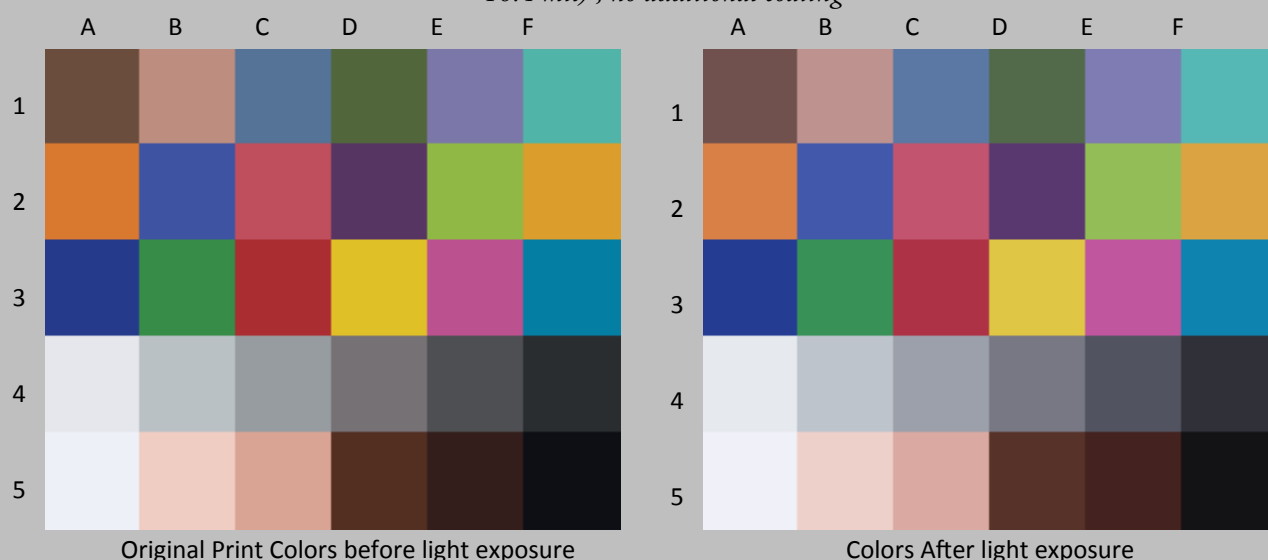
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	80.5	4.3	35.7	37.0	12.4	12.7	13.5	9.4
B1	Light Skin	81.8	4.8	63.3	64.4	16.6	16.4	15.3	10.7
C1	Blue sky	88.9	3.3	47.2	48.5	-3.7	-2.6	-22.8	-25.6
D1	Foliage	88.4	3.6	40.6	41.8	-14.1	-13.9	20.9	17.5
E1	blue flower	93.3	2.7	51.6	52.9	10.3	10.9	-25.7	-28.0
F1	bluish green	93.1	2.9	67.5	68.4	-33.2	-31.9	-3.4	-5.8
A1	orange	91.7	6.0	61.0	62.1	34.6	33.4	54.5	48.8
B2	purplish blue	98.0	1.9	37.2	38.4	11.0	11.8	-45.9	-47.1
C2	moderate red	87.4	6.9	49.4	50.5	47.5	47.2	16.4	9.6
D2	purple	87.6	4.4	27.7	28.9	22.1	23.7	-20.6	-24.6
E2	yellow green	93.8	4.2	70.1	71.0	-26.9	-27.1	51.8	47.7
F2	orange yellow	92.4	5.7	69.5	70.6	17.2	15.9	64.4	59.0
A3	blue	95.9	2.8	26.6	27.6	14.7	16.4	-48.5	-50.5
B3	green	93.1	4.0	51.9	53.0	-38.5	-37.8	28.5	24.7
C3	red	90.2	6.4	39.7	41.0	50.8	50.5	28.5	22.3
D3	yellow	93.3	5.4	79.0	79.9	1.2	0.0	73.2	67.9
E3	magenta	93.1	4.2	50.6	51.9	49.4	49.3	-12.7	-16.7
F3	cyan	92.6	3.3	48.8	49.9	-19.9	-18.3	-28.3	-30.9
A4	white	98.0	0.8	91.6	91.9	0.0	0.2	-2.9	-3.6
B4	neutral 8	82.1	2.3	77.6	78.3	-1.8	-1.5	-3.1	-5.3
C4	neutral 6.5	74.2	3.1	64.0	65.1	-0.8	-0.4	-2.6	-5.5
D4	neutral 5	58.1	4.7	48.4	49.7	1.5	2.3	-1.4	-5.8
E4	neutral 3.5	62.7	4.2	33.7	35.0	0.2	1.4	-2.1	-6.0
F4	black	81.3	2.7	17.9	19.3	-0.9	1.1	-2.1	-3.3
A5	paper white	100.0	0.4	94.8	94.9	0.4	0.6	-3.8	-4.2
B5	Skin highlight L*=88	85.4	2.7	85.0	85.6	10.8	10.6	9.9	7.2
C5	Skin highlight L* =75	85.2	4.3	72.3	73.3	18.9	18.6	16.3	12.1
D5	Skin shadow L*=28	99.3	1.3	23.8	24.9	15.8	16.1	15.7	15.1
E5	Skin shadow L*=13	69.1	5.2	14.0	16.6	11.5	15.0	6.0	8.8
F5	Maximum Black	98.1	0.9	4.2	4.8	-0.1	0.5	-2.9	-2.5
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>30 Megalux hours</b>				
Average Score for all patches		87.6	96.6	3.6					
Worst 10% (3 lowest scoring patches)		63.3	92.1	6.4					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil), no additional coating*



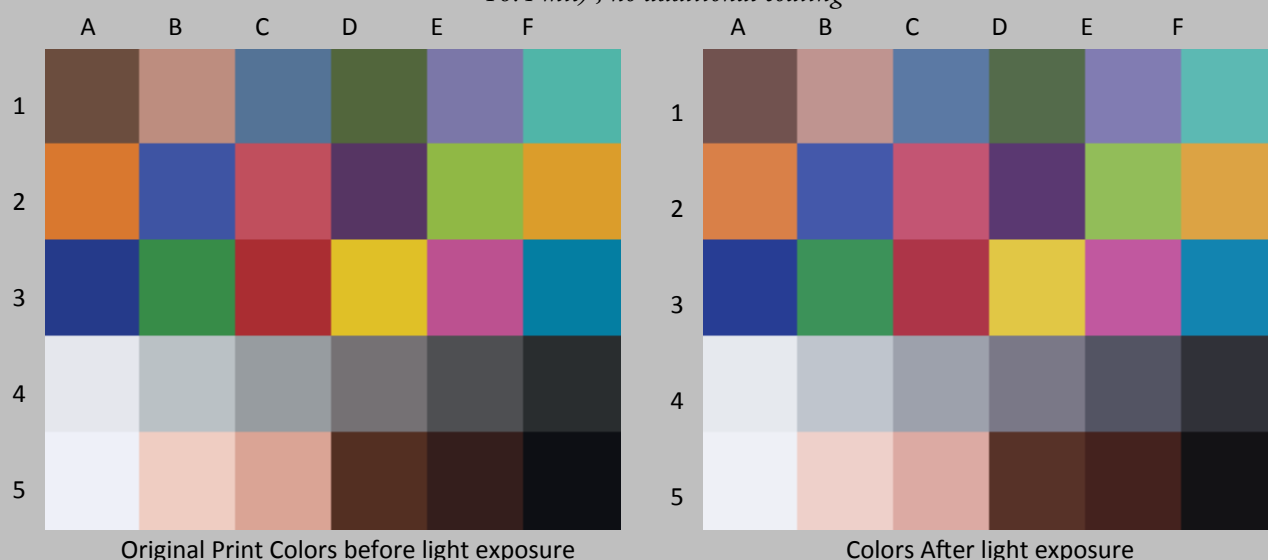
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	73.4	5.6	35.7	37.2	12.4	12.4	13.5	8.1
B1	Light Skin	76.9	5.9	63.3	64.8	16.6	16.3	15.3	9.6
C1	Blue sky	85.2	4.2	47.2	48.9	-3.7	-2.4	-22.8	-26.5
D1	Foliage	83.1	5.0	40.6	42.2	-14.1	-14.0	20.9	16.1
E1	blue flower	91.8	3.3	51.6	53.3	10.3	10.8	-25.7	-28.5
F1	bluish green	91.2	3.7	67.5	68.8	-33.2	-31.5	-3.4	-6.3
A1	orange	89.0	7.8	61.0	62.4	34.6	32.9	54.5	47.1
B2	purplish blue	97.6	2.3	37.2	38.8	11.0	11.6	-45.9	-47.4
C2	moderate red	83.8	8.8	49.4	50.9	47.5	47.3	16.4	7.8
D2	purple	83.6	5.7	27.7	29.2	22.1	23.9	-20.6	-25.8
E2	yellow green	91.8	5.4	70.1	71.4	-26.9	-27.1	51.8	46.5
F2	orange yellow	90.3	7.1	69.5	70.9	17.2	15.4	64.4	57.7
A3	blue	94.3	3.6	26.6	27.8	14.7	16.5	-48.5	-51.3
B3	green	90.7	5.2	51.9	53.4	-38.5	-38.0	28.5	23.6
C3	red	86.2	8.7	39.7	41.0	50.8	50.6	28.5	20.0
D3	yellow	91.4	6.9	79.0	80.2	1.2	-0.4	73.2	66.5
E3	magenta	91.2	5.2	50.6	52.2	49.4	49.2	-12.7	-17.7
F3	cyan	90.7	4.0	48.8	50.3	-19.9	-18.1	-28.3	-31.6
A4	white	99.8	0.7	91.6	92.1	0.0	0.2	-2.9	-3.4
B4	neutral 8	80.9	2.6	77.6	78.7	-1.8	-1.4	-3.1	-5.4
C4	neutral 6.5	68.4	3.8	64.0	65.5	-0.8	-0.3	-2.6	-6.0
D4	neutral 5	48.6	5.7	48.4	50.2	1.5	2.3	-1.4	-6.7
E4	neutral 3.5	48.3	5.6	33.7	35.3	0.2	1.3	-2.1	-7.4
F4	black	76.3	3.3	17.9	19.6	-0.9	1.0	-2.1	-4.1
A5	paper white	100.0	0.4	94.8	95.1	0.4	0.5	-3.8	-3.9
B5	Skin highlight L*=88	83.6	3.0	85.0	85.8	10.8	10.6	9.9	7.0
C5	Skin highlight L* =75	82.5	5.1	72.3	73.7	18.9	18.4	16.3	11.4
D5	Skin shadow L*=28	96.6	1.8	23.8	25.1	15.8	15.8	15.7	14.5
E5	Skin shadow L*=13	65.4	5.9	14.0	17.2	11.5	15.4	6.0	9.0
F5	Maximum Black	95.1	1.4	4.2	5.2	-0.1	0.6	-2.9	-2.2
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>40 Megalux hours</b>				
Average Score for all patches		84.3	95.9	4.6					
Worst 10% (3 lowest scoring patches)		54.1	90.5	8.4					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



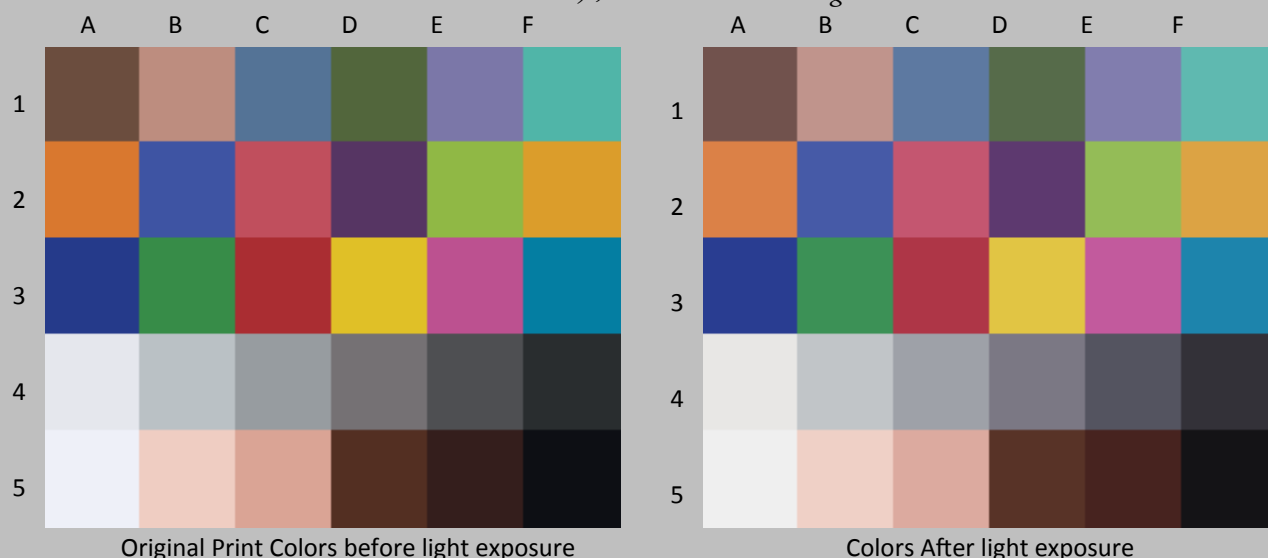
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	68.5	6.6	35.7	37.6	12.4	12.6	13.5	7.2
B1	Light Skin	74.7	6.5	63.3	65.1	16.6	16.2	15.3	9.1
C1	Blue sky	84.2	4.6	47.2	49.3	-3.7	-2.1	-22.8	-26.6
D1	Foliage	80.3	5.8	40.6	42.4	-14.1	-14.0	20.9	15.4
E1	blue flower	91.4	3.6	51.6	53.7	10.3	10.9	-25.7	-28.5
F1	bluish green	89.8	4.2	67.5	69.2	-33.2	-31.0	-3.4	-6.6
A1	orange	87.3	8.9	61.0	62.7	34.6	32.5	54.5	46.1
B2	purplish blue	97.3	2.6	37.2	39.1	11.0	11.7	-45.9	-47.5
C2	moderate red	81.6	9.9	49.4	51.1	47.5	47.1	16.4	6.7
D2	purple	80.9	6.5	27.7	29.4	22.1	24.1	-20.6	-26.6
E2	yellow green	90.6	6.2	70.1	71.6	-26.9	-26.9	51.8	45.8
F2	orange yellow	88.6	8.2	69.5	71.2	17.2	15.1	64.4	56.6
A3	blue	93.8	3.9	26.6	28.0	14.7	16.6	-48.5	-51.6
B3	green	89.0	6.0	51.9	53.7	-38.5	-37.7	28.5	22.7
C3	red	83.9	10.0	39.7	41.1	50.8	50.5	28.5	18.7
D3	yellow	89.9	8.0	79.0	80.5	1.2	-0.6	73.2	65.5
E3	magenta	90.2	5.8	50.6	52.5	49.4	49.0	-12.7	-18.2
F3	cyan	89.4	4.6	48.8	50.6	-19.9	-17.8	-28.3	-31.9
A4	white	100.0	0.8	91.6	92.2	0.0	0.2	-2.9	-3.3
B4	neutral 8	79.9	2.8	77.6	79.0	-1.8	-1.2	-3.1	-5.4
C4	neutral 6.5	65.3	4.3	64.0	65.9	-0.8	-0.1	-2.6	-6.3
D4	neutral 5	40.5	6.5	48.4	50.6	1.5	2.5	-1.4	-7.5
E4	neutral 3.5	40.0	6.5	33.7	35.7	0.2	1.7	-2.1	-8.2
F4	black	72.0	3.8	17.9	19.9	-0.9	1.1	-2.1	-4.6
A5	paper white	100.0	0.4	94.8	95.1	0.4	0.5	-3.8	-3.8
B5	Skin highlight L*=88	81.4	3.4	85.0	86.0	10.8	10.4	9.9	6.7
C5	Skin highlight L* =75	80.3	5.6	72.3	73.9	18.9	18.2	16.3	10.9
D5	Skin shadow L*=28	94.8	2.3	23.8	25.3	15.8	15.8	15.7	14.1
E5	Skin shadow L*=13	63.1	6.4	14.0	17.6	11.5	15.8	6.0	9.0
F5	Maximum Black	93.9	1.7	4.2	5.5	-0.1	0.7	-2.9	-2.2
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>50 Megalux hours</b>				
Average Score for all patches		82.1	94.9	5.2					
Worst 10% (3 lowest scoring patches)		47.8	89.2	9.6					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil), no additional coating*



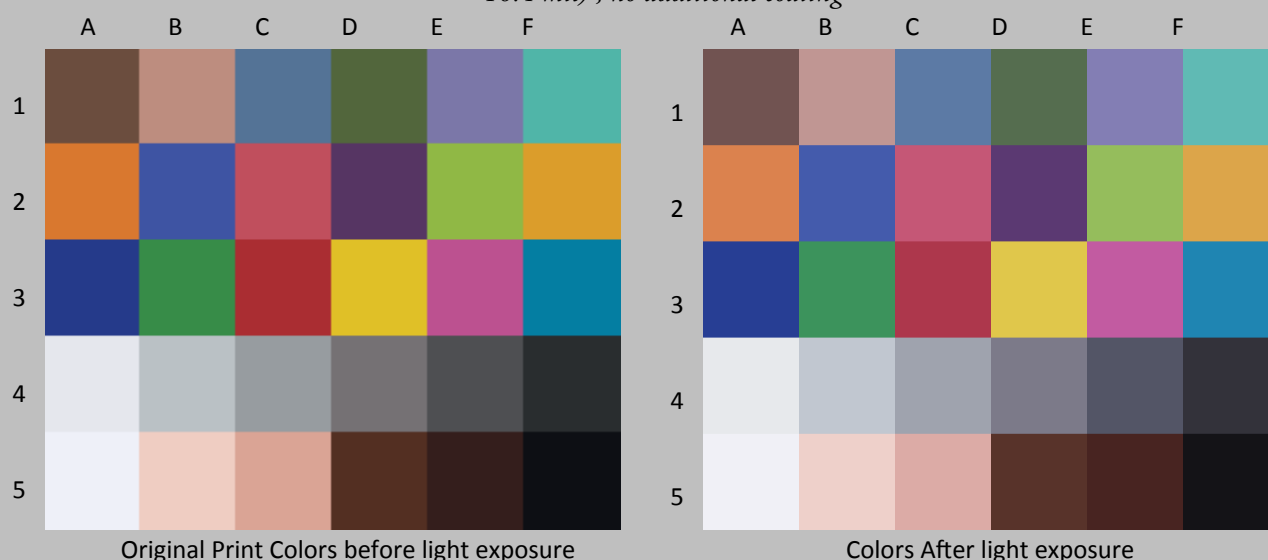
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	66.0	7.1	35.7	37.9	12.4	12.6	13.5	6.8
B1	Light Skin	73.8	6.7	63.3	65.4	16.6	16.2	15.3	8.9
C1	Blue sky	83.9	4.9	47.2	49.6	-3.7	-2.0	-22.8	-26.7
D1	Foliage	78.7	6.2	40.6	42.7	-14.1	-13.9	20.9	15.0
E1	blue flower	92.5	3.6	51.6	54.1	10.3	10.9	-25.7	-28.2
F1	bluish green	89.3	4.5	67.5	69.4	-33.2	-30.5	-3.4	-6.4
A1	orange	85.9	9.8	61.0	62.9	34.6	32.2	54.5	45.2
B2	purplish blue	97.8	2.6	37.2	39.4	11.0	11.5	-45.9	-47.3
C2	moderate red	80.1	10.7	49.4	51.4	47.5	47.0	16.4	5.9
D2	purple	79.8	6.9	27.7	29.8	22.1	24.2	-20.6	-26.9
E2	yellow green	89.8	6.7	70.1	71.9	-26.9	-26.7	51.8	45.3
F2	orange yellow	87.4	9.1	69.5	71.4	17.2	14.9	64.4	55.9
A3	blue	93.9	4.0	26.6	28.3	14.7	16.5	-48.5	-51.6
B3	green	87.7	6.7	51.9	54.0	-38.5	-37.4	28.5	22.1
C3	red	82.1	11.1	39.7	41.4	50.8	50.5	28.5	17.6
D3	yellow	88.7	8.9	79.0	80.7	1.2	-0.7	73.2	64.6
E3	magenta	90.1	6.0	50.6	52.9	49.4	48.8	-12.7	-18.3
F3	cyan	89.3	4.8	48.8	51.0	-19.9	-17.6	-28.3	-31.8
A4	white	100.0	0.7	91.6	92.3	0.0	0.2	-2.9	-2.8
B4	neutral 8	83.4	2.7	77.6	79.3	-1.8	-1.1	-3.1	-5.0
C4	neutral 6.5	66.7	4.4	64.0	66.3	-0.8	0.0	-2.6	-6.1
D4	neutral 5	38.1	6.9	48.4	50.9	1.5	2.6	-1.4	-7.7
E4	neutral 3.5	33.9	7.2	33.7	36.0	0.2	1.7	-2.1	-8.7
F4	black	69.2	4.2	17.9	20.3	-0.9	1.2	-2.1	-4.8
A5	paper white	100.0	0.6	94.8	95.1	0.4	0.4	-3.8	-3.3
B5	Skin highlight L*=88	81.9	3.3	85.0	86.1	10.8	10.3	9.9	6.8
C5	Skin highlight L* =75	79.3	6.0	72.3	74.2	18.9	18.1	16.3	10.7
D5	Skin shadow L*=28	93.7	2.6	23.8	25.5	15.8	15.8	15.7	13.8
E5	Skin shadow L*=13	56.5	7.4	14.0	18.1	11.5	16.4	6.0	9.6
F5	Maximum Black	91.4	1.9	4.2	5.5	-0.1	0.9	-2.9	-2.0
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>60 Megalux hours</b>				
Average Score for all patches		81.0	93.9	5.6					
Worst 10% (3 lowest scoring patches)		42.8	87.5	10.5					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



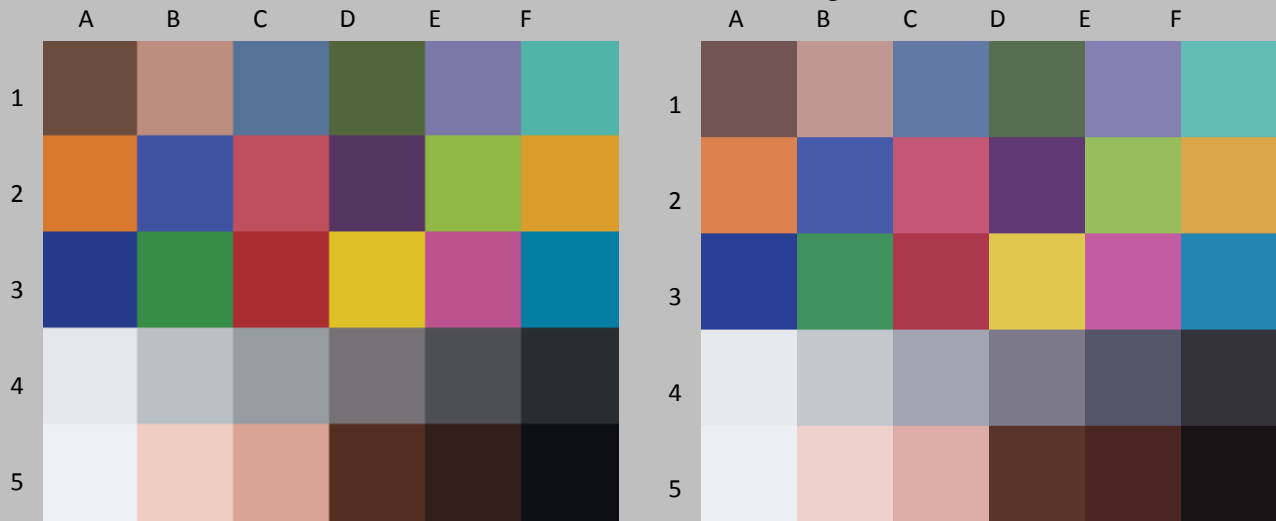
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	72.7	6.1	35.7	38.2	12.4	12.8	13.5	8.0
B1	Light Skin	81.6	5.2	63.3	65.5	16.6	16.2	15.3	10.7
C1	Blue sky	91.4	3.5	47.2	49.8	-3.7	-2.2	-22.8	-24.7
D1	Foliage	81.4	5.7	40.6	42.9	-14.1	-13.2	20.9	15.8
E1	blue flower	100.0	2.6	51.6	54.2	10.3	10.5	-25.7	-26.0
F1	bluish green	91.8	3.7	67.5	69.3	-33.2	-30.2	-3.4	-4.5
A1	orange	86.9	9.2	61.0	63.1	34.6	32.3	54.5	45.9
B2	purplish blue	99.5	2.4	37.2	39.5	11.0	10.8	-45.9	-45.2
C2	moderate red	83.2	9.2	49.4	51.7	47.5	46.7	16.4	7.5
D2	purple	85.1	5.5	27.7	30.1	22.1	24.0	-20.6	-25.3
E2	yellow green	90.9	6.0	70.1	71.7	-26.9	-25.9	51.8	46.0
F2	orange yellow	88.1	8.6	69.5	71.4	17.2	15.1	64.4	56.3
A3	blue	97.6	2.5	26.6	28.4	14.7	15.8	-48.5	-49.8
B3	green	88.6	6.3	51.9	53.9	-38.5	-36.5	28.5	22.8
C3	red	83.9	10.1	39.7	41.9	50.8	50.3	28.5	18.7
D3	yellow	89.7	8.2	79.0	80.5	1.2	-0.3	73.2	65.3
E3	magenta	93.8	4.5	50.6	53.2	49.4	48.2	-12.7	-16.2
F3	cyan	93.5	3.5	48.8	51.0	-19.9	-17.8	-28.3	-30.0
A4	white	67.5	3.6	91.6	91.8	0.0	-0.2	-2.9	0.7
B4	neutral 8	93.6	2.0	77.6	79.2	-1.8	-1.2	-3.1	-2.2
C4	neutral 6.5	88.8	2.9	64.0	66.4	-0.8	0.0	-2.6	-3.9
D4	neutral 5	54.3	5.5	48.4	51.0	1.5	2.7	-1.4	-6.1
E4	neutral 3.5	46.3	6.1	33.7	36.1	0.2	2.0	-2.1	-7.4
F4	black	72.0	4.2	17.9	20.6	-0.9	1.7	-2.1	-3.9
A5	paper white	64.1	3.9	94.8	94.5	0.4	0.1	-3.8	0.1
B5	Skin highlight L*=88	97.9	1.2	85.0	85.8	10.8	10.1	9.9	9.5
C5	Skin highlight L* =75	87.3	4.1	72.3	74.1	18.9	17.9	16.3	12.7
D5	Skin shadow L*=28	96.8	2.5	23.8	26.0	15.8	16.0	15.7	14.5
E5	Skin shadow L*=13	47.4	8.8	14.0	18.9	11.5	17.0	6.0	10.7
F5	Maximum Black	86.8	2.5	4.2	6.0	-0.1	1.2	-2.9	-1.7
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>70 Megalux hours</b>				
Average Score for all patches		83.4	92.9	5.0					
Worst 10% (3 lowest scoring patches)		49.3	84.8	9.5					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	60.5	8.3	35.7	38.5	12.4	12.7	13.5	5.8
B1	Light Skin	70.9	7.6	63.3	66.0	16.6	16.1	15.3	8.2
C1	Blue sky	83.3	5.4	47.2	50.3	-3.7	-1.6	-22.8	-26.6
D1	Foliage	74.8	7.4	40.6	43.3	-14.1	-13.5	20.9	14.1
E1	blue flower	94.1	3.8	51.6	54.8	10.3	10.9	-25.7	-27.8
F1	bluish green	86.7	5.5	67.5	70.0	-33.2	-29.4	-3.4	-6.5
A1	orange	82.8	11.8	61.0	63.4	34.6	31.7	54.5	43.3
B2	purplish blue	99.4	2.9	37.2	40.0	11.0	11.3	-45.9	-46.6
C2	moderate red	77.4	12.1	49.4	52.0	47.5	46.6	16.4	4.6
D2	purple	77.8	7.7	27.7	30.4	22.1	24.4	-20.6	-27.5
E2	yellow green	87.3	8.2	70.1	72.3	-26.9	-26.1	51.8	43.9
F2	orange yellow	85.0	10.7	69.5	71.8	17.2	14.4	64.4	54.3
A3	blue	94.7	3.9	26.6	28.8	14.7	16.3	-48.5	-51.2
B3	green	85.0	8.1	51.9	54.4	-38.5	-36.7	28.5	21.0
C3	red	78.7	13.1	39.7	41.9	50.8	50.2	28.5	15.6
D3	yellow	86.2	10.7	79.0	80.9	1.2	-0.9	73.2	62.8
E3	magenta	89.8	6.4	50.6	53.6	49.4	48.2	-12.7	-18.3
F3	cyan	88.5	5.3	48.8	51.6	-19.9	-17.0	-28.3	-31.7
A4	white	96.9	1.0	91.6	92.3	0.0	0.3	-2.9	-2.2
B4	neutral 8	85.0	3.0	77.6	79.8	-1.8	-0.7	-3.1	-4.6
C4	neutral 6.5	66.3	4.8	64.0	67.1	-0.8	0.4	-2.6	-6.1
D4	neutral 5	31.4	7.7	48.4	51.7	1.5	3.0	-1.4	-8.3
E4	neutral 3.5	23.4	8.3	33.7	36.6	0.2	2.1	-2.1	-9.7
F4	black	63.0	5.1	17.9	21.0	-0.9	1.6	-2.1	-5.3
A5	paper white	94.4	1.0	94.8	94.9	0.4	0.5	-3.8	-2.7
B5	Skin highlight L*=88	81.3	3.4	85.0	86.1	10.8	10.1	9.9	6.7
C5	Skin highlight L* =75	77.4	6.6	72.3	74.7	18.9	17.9	16.3	10.2
D5	Skin shadow L*=28	91.5	3.3	23.8	26.1	15.8	15.7	15.7	13.3
E5	Skin shadow L*=13	47.5	9.0	14.0	19.3	11.5	17.3	6.0	10.4
F5	Maximum Black	84.9	2.8	4.2	6.2	-0.1	1.4	-2.9	-1.7
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>80 Megalux hours</b>				
Average Score for all patches		78.2	91.7	6.5					
Worst 10% (3 lowest scoring patches)		34.1	83.8	12.4					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



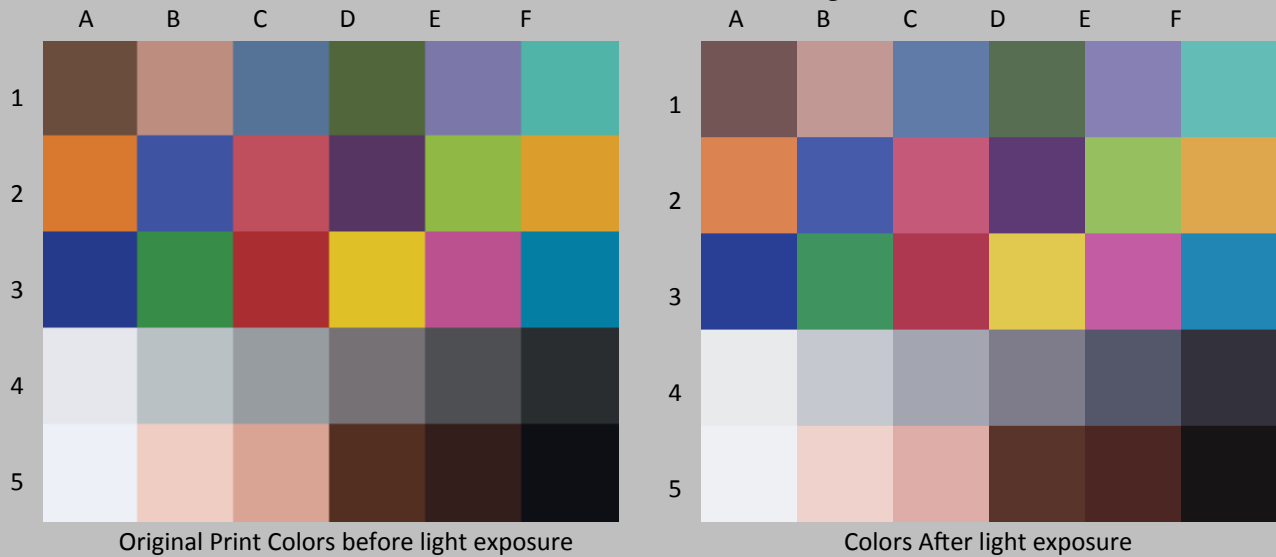
Original Print Colors before light exposure

Colors After light exposure

Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	60.8	8.3	35.7	38.8	12.4	12.9	13.5	5.8
B1	Light Skin	71.0	7.7	63.3	66.3	16.6	16.2	15.3	8.2
C1	Blue sky	83.6	5.5	47.2	50.6	-3.7	-1.3	-22.8	-26.4
D1	Foliage	74.2	7.6	40.6	43.6	-14.1	-13.1	20.9	14.0
E1	blue flower	95.2	4.0	51.6	55.2	10.3	11.0	-25.7	-27.4
F1	bluish green	85.8	5.9	67.5	70.3	-33.2	-28.9	-3.4	-6.4
A1	orange	82.4	12.1	61.0	63.6	34.6	31.6	54.5	43.1
B2	purplish blue	100.0	3.1	37.2	40.3	11.0	11.3	-45.9	-46.1
C2	moderate red	77.4	12.2	49.4	52.3	47.5	46.6	16.4	4.6
D2	purple	78.4	7.6	27.7	30.6	22.1	24.5	-20.6	-27.2
E2	yellow green	87.1	8.4	70.1	72.4	-26.9	-25.6	51.8	43.8
F2	orange yellow	84.5	11.1	69.5	72.0	17.2	14.4	64.4	53.9
A3	blue	95.4	3.7	26.6	28.9	14.7	16.3	-48.5	-50.8
B3	green	84.8	8.2	51.9	54.6	-38.5	-36.2	28.5	21.0
C3	red	78.5	13.3	39.7	42.1	50.8	50.2	28.5	15.5
D3	yellow	85.7	11.1	79.0	80.9	1.2	-0.7	73.2	62.4
E3	magenta	90.2	6.4	50.6	53.8	49.4	48.1	-12.7	-18.1
F3	cyan	88.7	5.4	48.8	51.8	-19.9	-16.8	-28.3	-31.4
A4	white	95.9	1.1	91.6	92.2	0.0	0.3	-2.9	-2.1
B4	neutral 8	85.5	3.1	77.6	80.0	-1.8	-0.5	-3.1	-4.4
C4	neutral 6.5	67.5	4.9	64.0	67.3	-0.8	0.7	-2.6	-5.8
D4	neutral 5	32.0	7.8	48.4	51.9	1.5	3.2	-1.4	-8.2
E4	neutral 3.5	23.9	8.3	33.7	36.8	0.2	2.3	-2.1	-9.6
F4	black	61.5	5.3	17.9	21.2	-0.9	1.9	-2.1	-5.2
A5	paper white	93.5	1.1	94.8	94.7	0.4	0.5	-3.8	-2.7
B5	Skin highlight L*=88	80.3	3.6	85.0	86.2	10.8	10.1	9.9	6.6
C5	Skin highlight L* =75	76.9	6.7	72.3	74.8	18.9	17.8	16.3	10.1
D5	Skin shadow L*=28	91.5	3.5	23.8	26.3	15.8	15.8	15.7	13.3
E5	Skin shadow L*=13	43.3	9.8	14.0	20.0	11.5	17.6	6.0	10.8
F5	Maximum Black	81.4	3.4	4.2	6.7	-0.1	1.6	-2.9	-1.4
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>90 Megalux hours</b>				
Average Score for all patches		77.9	90.6	6.7					
Worst 10% (3 lowest scoring patches)		33.1	81.4	12.5					

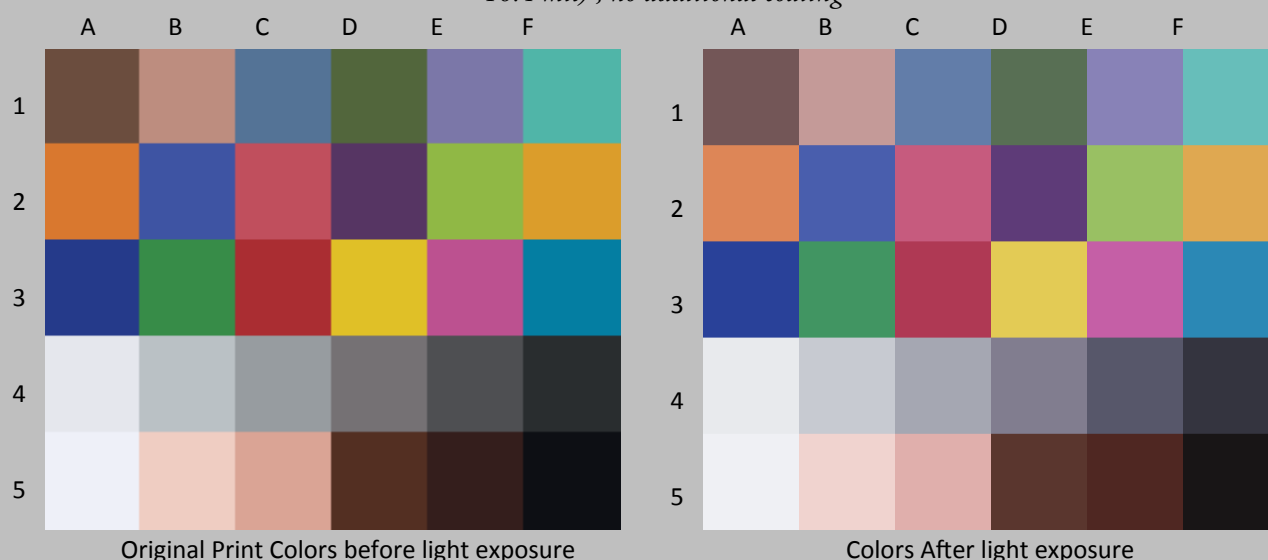


*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



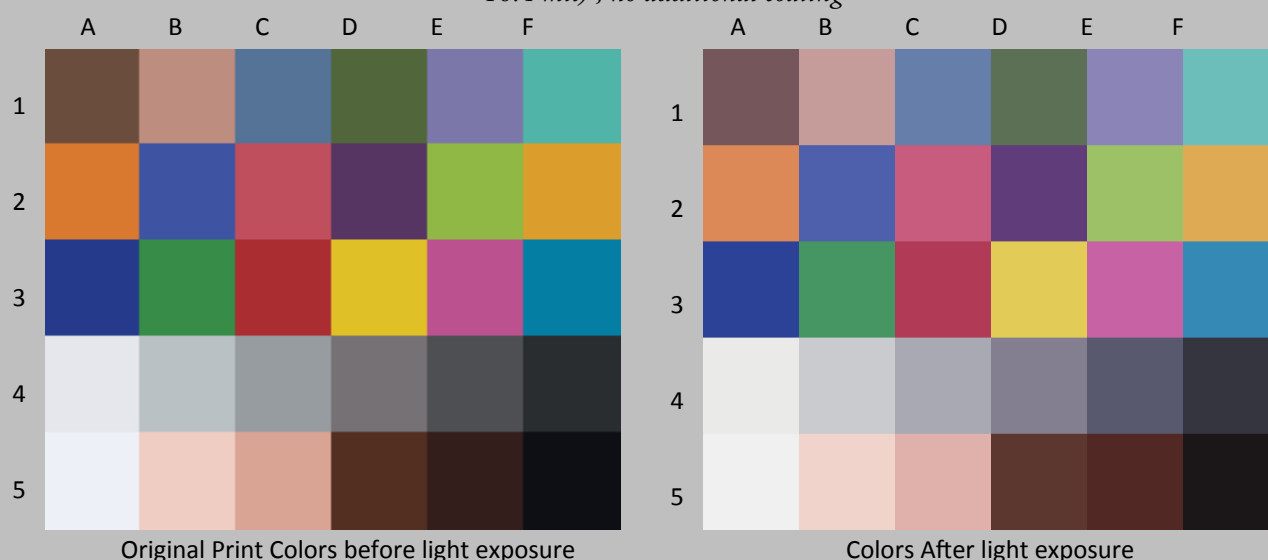
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	55.1	9.4	35.7	39.1	12.4	12.8	13.5	4.8
B1	Light Skin	69.4	8.2	63.3	66.8	16.6	16.0	15.3	7.9
C1	Blue sky	82.5	5.9	47.2	51.0	-3.7	-1.3	-22.8	-26.7
D1	Foliage	70.8	8.5	40.6	43.9	-14.1	-13.2	20.9	13.1
E1	blue flower	96.2	4.3	51.6	55.7	10.3	10.9	-25.7	-27.2
F1	bluish green	84.9	6.3	67.5	70.6	-33.2	-28.6	-3.4	-6.4
A1	orange	80.7	13.3	61.0	63.9	34.6	31.1	54.5	42.1
B2	purplish blue	100.0	3.3	37.2	40.5	11.0	11.1	-45.9	-46.2
C2	moderate red	75.3	13.3	49.4	52.6	47.5	46.4	16.4	3.6
D2	purple	75.4	8.5	27.7	30.8	22.1	24.5	-20.6	-28.2
E2	yellow green	85.7	9.3	70.1	72.8	-26.9	-25.6	51.8	43.0
F2	orange yellow	83.2	12.0	69.5	72.4	17.2	14.0	64.4	53.2
A3	blue	94.5	4.2	26.6	29.2	14.7	16.2	-48.5	-51.4
B3	green	83.5	8.9	51.9	54.9	-38.5	-36.3	28.5	20.3
C3	red	75.7	14.9	39.7	42.3	50.8	50.2	28.5	13.9
D3	yellow	84.5	12.1	79.0	81.4	1.2	-1.1	73.2	61.6
E3	magenta	89.7	6.8	50.6	54.3	49.4	47.9	-12.7	-18.3
F3	cyan	88.3	5.7	48.8	52.2	-19.9	-16.8	-28.3	-31.6
A4	white	87.4	1.9	91.6	92.4	0.0	0.2	-2.9	-1.3
B4	neutral 8	88.2	3.4	77.6	80.5	-1.8	-0.4	-3.1	-3.9
C4	neutral 6.5	66.0	5.4	64.0	67.9	-0.8	0.8	-2.6	-5.9
D4	neutral 5	28.5	8.3	48.4	52.4	1.5	3.2	-1.4	-8.5
E4	neutral 3.5	14.0	9.3	33.7	37.1	0.2	2.3	-2.1	-10.5
F4	black	56.6	5.8	17.9	21.4	-0.9	1.9	-2.1	-5.8
A5	paper white	84.2	2.0	94.8	94.9	0.4	0.4	-3.8	-1.8
B5	Skin highlight L*=88	81.8	3.6	85.0	86.6	10.8	9.9	9.9	6.8
C5	Skin highlight L* =75	76.0	7.1	72.3	75.3	18.9	17.6	16.3	10.0
D5	Skin shadow L*=28	89.8	3.8	23.8	26.4	15.8	15.7	15.7	13.0
E5	Skin shadow L*=13	39.1	10.5	14.0	20.4	11.5	18.1	6.0	11.0
F5	Maximum Black	76.4	3.7	4.2	6.7	-0.1	1.9	-2.9	-1.0
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>100 Megalux hours</b>				
Average Score for all patches		75.5	89.8	7.3					
Worst 10% (3 lowest scoring patches)		27.2	80.1	13.8					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



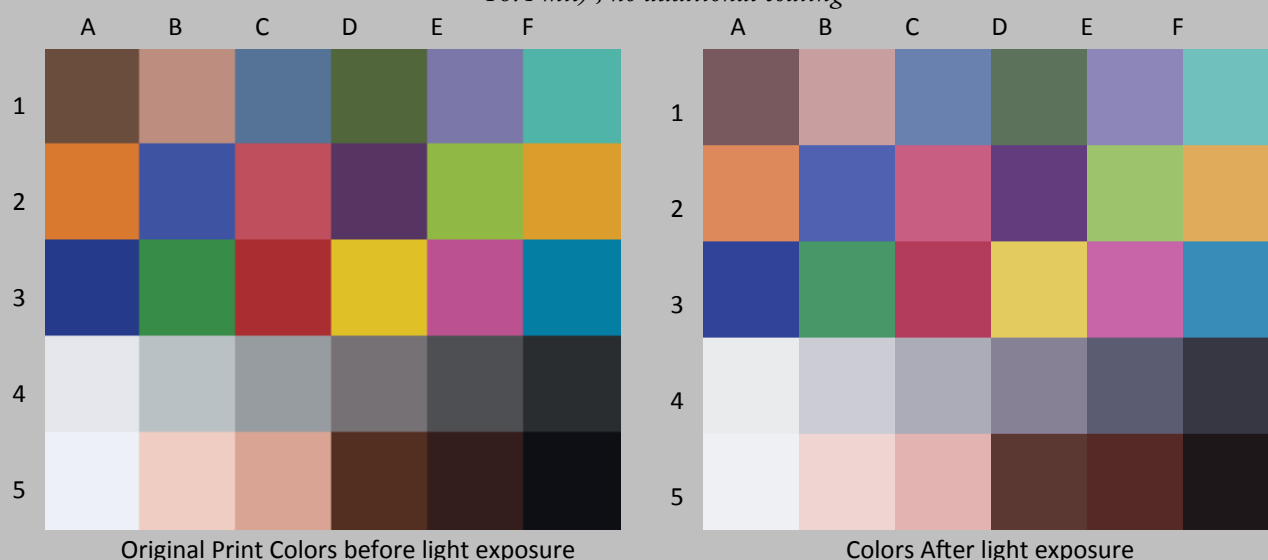
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	49.2	10.7	35.7	39.8	12.4	13.1	13.5	3.7
B1	Light Skin	64.8	9.5	63.3	67.5	16.6	16.2	15.3	6.8
C1	Blue sky	79.7	6.9	47.2	51.8	-3.7	-0.8	-22.8	-27.1
D1	Foliage	67.0	9.6	40.6	44.5	-14.1	-13.0	20.9	12.1
E1	blue flower	94.9	5.2	51.6	56.4	10.3	11.2	-25.7	-27.4
F1	bluish green	81.6	7.6	67.5	71.3	-33.2	-27.6	-3.4	-7.0
A1	orange	78.1	15.0	61.0	64.5	34.6	30.8	54.5	40.4
B2	purplish blue	100.0	4.0	37.2	41.2	11.0	11.2	-45.9	-46.1
C2	moderate red	72.8	14.7	49.4	53.3	47.5	46.4	16.4	2.3
D2	purple	72.7	9.6	27.7	31.5	22.1	25.0	-20.6	-28.9
E2	yellow green	83.4	10.7	70.1	73.4	-26.9	-25.2	51.8	41.7
F2	orange yellow	80.8	13.7	69.5	72.9	17.2	13.7	64.4	51.6
A3	blue	94.1	4.6	26.6	29.6	14.7	16.4	-48.5	-51.5
B3	green	80.9	10.3	51.9	55.6	-38.5	-35.6	28.5	19.2
C3	red	73.2	16.4	39.7	42.8	50.8	50.4	28.5	12.4
D3	yellow	82.1	13.9	79.0	81.8	1.2	-1.3	73.2	59.8
E3	magenta	88.9	7.6	50.6	55.1	49.4	47.8	-12.7	-18.7
F3	cyan	86.4	6.7	48.8	52.9	-19.9	-16.1	-28.3	-31.8
A4	white	90.6	1.8	91.6	92.7	0.0	0.4	-2.9	-1.6
B4	neutral 8	82.7	4.2	77.6	81.2	-1.8	0.0	-3.1	-4.3
C4	neutral 6.5	59.4	6.5	64.0	68.7	-0.8	1.3	-2.6	-6.4
D4	neutral 5	18.2	9.6	48.4	53.2	1.5	3.8	-1.4	-9.4
E4	neutral 3.5	3.0	10.5	33.7	37.8	0.2	2.9	-2.1	-11.5
F4	black	48.9	6.7	17.9	21.9	-0.9	2.1	-2.1	-6.5
A5	paper white	88.6	1.6	94.8	95.0	0.4	0.4	-3.8	-2.2
B5	Skin highlight L*=88	76.9	4.3	85.0	86.9	10.8	9.8	9.9	6.1
C5	Skin highlight L* =75	71.9	8.4	72.3	76.0	18.9	17.5	16.3	8.9
D5	Skin shadow L*=28	87.6	4.5	23.8	26.9	15.8	15.7	15.7	12.5
E5	Skin shadow L*=13	32.5	11.7	14.0	21.2	11.5	18.8	6.0	11.6
F5	Maximum Black	68.8	4.6	4.2	7.2	-0.1	2.4	-2.9	-0.5
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>120 Megalux hours</b>				
Average Score for all patches		72.0	87.9	8.4					
Worst 10% (3 lowest scoring patches)		17.9	77.3	15.4					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*



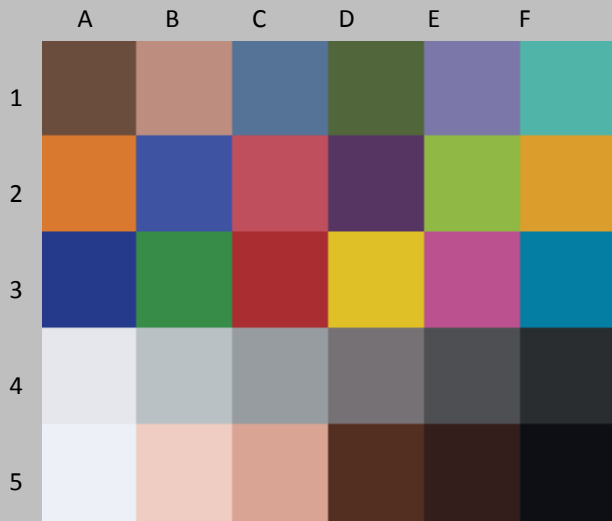
Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	46.4	11.4	35.7	40.4	12.4	13.2	13.5	3.2
B1	Light Skin	66.5	9.4	63.3	68.1	16.6	16.1	15.3	7.2
C1	Blue sky	82.8	6.8	47.2	52.4	-3.7	-0.7	-22.8	-26.1
D1	Foliage	64.4	10.5	40.6	45.1	-14.1	-12.5	20.9	11.6
E1	blue flower	99.9	5.5	51.6	57.1	10.3	10.9	-25.7	-25.8
F1	bluish green	81.2	8.0	67.5	71.8	-33.2	-26.9	-3.4	-5.8
A1	orange	76.7	16.0	61.0	65.0	34.6	30.4	54.5	39.6
B2	purplish blue	98.0	4.9	37.2	41.9	11.0	10.6	-45.9	-44.5
C2	moderate red	72.5	15.0	49.4	53.9	47.5	46.0	16.4	2.2
D2	purple	73.0	9.7	27.7	32.0	22.1	25.1	-20.6	-28.8
E2	yellow green	82.3	11.4	70.1	73.8	-26.9	-24.5	51.8	41.2
F2	orange yellow	79.4	14.7	69.5	73.3	17.2	13.5	64.4	50.7
A3	blue	97.4	4.2	26.6	30.3	14.7	15.5	-48.5	-50.1
B3	green	79.6	11.1	51.9	56.0	-38.5	-34.9	28.5	18.8
C3	red	72.0	17.2	39.7	43.4	50.8	50.2	28.5	11.7
D3	yellow	80.7	14.9	79.0	82.0	1.2	-1.2	73.2	58.8
E3	magenta	90.8	7.4	50.6	55.8	49.4	46.9	-12.7	-17.3
F3	cyan	88.9	6.5	48.8	53.6	-19.9	-16.1	-28.3	-30.4
A4	white	63.3	4.1	91.6	92.5	0.0	0.0	-2.9	1.1
B4	neutral 8	84.3	4.5	77.6	81.6	-1.8	0.0	-3.1	-2.2
C4	neutral 6.5	71.4	6.4	64.0	69.5	-0.8	1.4	-2.6	-4.9
D4	neutral 5	23.0	9.6	48.4	54.0	1.5	4.0	-1.4	-8.8
E4	neutral 3.5	0.8	11.0	33.7	38.4	0.2	3.0	-2.1	-11.6
F4	black	45.9	7.3	17.9	22.5	-0.9	2.4	-2.1	-6.7
A5	paper white	61.7	4.1	94.8	94.8	0.4	0.0	-3.8	0.4
B5	Skin highlight L*=88	84.7	3.4	85.0	87.0	10.8	9.3	9.9	7.6
C5	Skin highlight L* =75	74.1	8.1	72.3	76.5	18.9	17.2	16.3	9.6
D5	Skin shadow L*=28	86.2	5.1	23.8	27.5	15.8	15.6	15.7	12.2
E5	Skin shadow L*=13	26.5	12.9	14.0	22.1	11.5	19.4	6.0	12.0
F5	Maximum Black	61.4	5.6	4.2	8.0	-0.1	3.0	-2.9	-0.1
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>140 Megalux hours</b>				
Average Score for all patches		70.5	86.0	8.9					
Worst 10% (3 lowest scoring patches)		16.7	74.3	16.1					

*Epson Stylus Photo 1400, Epson OEM (Claria 79), Red River Ultra Pro Satin 2.0 (68lb - 270gsm - 10.4 mil) , no additional coating*

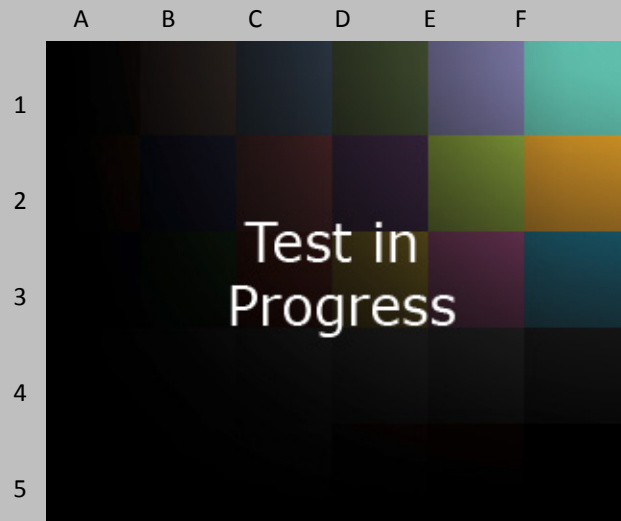


Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin	39.1	12.9	35.7	41.2	12.4	13.6	13.5	1.9
B1	Light Skin	59.8	11.1	63.3	68.9	16.6	16.4	15.3	5.7
C1	Blue sky	77.9	8.3	47.2	53.4	-3.7	0.1	-22.8	-26.9
D1	Foliage	58.2	12.2	40.6	45.8	-14.1	-11.9	20.9	10.1
E1	blue flower	97.0	6.5	51.6	58.0	10.3	11.4	-25.7	-26.5
F1	bluish green	76.1	9.9	67.5	72.6	-33.2	-25.6	-3.4	-7.1
A1	orange	73.7	18.1	61.0	65.6	34.6	30.1	54.5	37.6
B2	purplish blue	98.6	5.5	37.2	42.7	11.0	11.1	-45.9	-44.7
C2	moderate red	69.4	16.7	49.4	54.6	47.5	45.9	16.4	0.6
D2	purple	69.4	10.9	27.7	32.7	22.1	25.6	-20.6	-29.7
E2	yellow green	79.0	13.4	70.1	74.3	-26.9	-23.9	51.8	39.4
F2	orange yellow	76.1	17.0	69.5	73.9	17.2	13.2	64.4	48.5
A3	blue	96.4	5.0	26.6	30.9	14.7	15.8	-48.5	-50.5
B3	green	76.2	12.8	51.9	56.6	-38.5	-34.2	28.5	17.4
C3	red	68.9	19.1	39.7	43.9	50.8	50.2	28.5	9.9
D3	yellow	77.7	17.2	79.0	82.5	1.2	-1.3	73.2	56.5
E3	magenta	88.9	8.6	50.6	56.6	49.4	46.7	-12.7	-18.3
F3	cyan	84.8	8.1	48.8	54.4	-19.9	-15.1	-28.3	-31.5
A4	white	85.9	2.2	91.6	92.8	0.0	0.4	-2.9	-1.1
B4	neutral 8	78.4	5.4	77.6	82.3	-1.8	0.6	-3.1	-3.8
C4	neutral 6.5	55.5	8.0	64.0	70.4	-0.8	2.1	-2.6	-6.3
D4	neutral 5	7.8	11.3	48.4	54.9	1.5	4.6	-1.4	-10.2
E4	neutral 3.5	(14.5)	12.6	33.7	39.1	0.2	3.7	-2.1	-12.9
F4	black	33.6	8.6	17.9	23.1	-0.9	3.0	-2.1	-7.7
A5	paper white	84.7	2.0	94.8	94.8	0.4	0.4	-3.8	-1.8
B5	Skin highlight L*=88	70.9	5.4	85.0	87.6	10.8	9.3	9.9	5.4
C5	Skin highlight L* =75	66.8	10.0	72.3	77.1	18.9	17.1	16.3	7.7
D5	Skin shadow L*=28	82.9	5.9	23.8	27.8	15.8	15.8	15.7	11.4
E5	Skin shadow L*=13	23.2	13.7	14.0	22.9	11.5	19.9	6.0	12.1
F5	Maximum Black	55.5	6.5	4.2	8.6	-0.1	3.3	-2.9	0.4
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>160 Megalux hours</b>				
Average Score for all patches		66.6	83.7	10.2					
Worst 10% (3 lowest scoring patches)		5.5	70.8	18.1					

*The 180 Megalux hour Update will be posted on approximately DEC 20, 2017.*



Original Print Colors before light exposure



Colors After light exposure

Patch #	Description	I* Color	$\Delta E$	L*		a*		b*	
				Before	After	Before	After	Before	After
A1	Dark Skin			35.7		12.4		13.5	
B1	Light Skin			63.3		16.6		15.3	
C1	Blue sky			47.2		-3.7		-22.8	
D1	Foliage			40.6		-14.1		20.9	
E1	blue flower			51.6		10.3		-25.7	
F1	bluish green			67.5		-33.2		-3.4	
A1	orange			61.0		34.6		54.5	
B2	purplish blue			37.2		11.0		-45.9	
C2	moderate red			49.4		47.5		16.4	
D2	purple			27.7		22.1		-20.6	
E2	yellow green			70.1		-26.9		51.8	
F2	orange yellow			69.5		17.2		64.4	
A3	blue			26.6		14.7		-48.5	
B3	green			51.9		-38.5		28.5	
C3	red			39.7		50.8		28.5	
D3	yellow			79.0		1.2		73.2	
E3	magenta			50.6		49.4		-12.7	
F3	cyan			48.8		-19.9		-28.3	
A4	white			91.6		0.0		-2.9	
B4	neutral 8			77.6		-1.8		-3.1	
C4	neutral 6.5			64.0		-0.8		-2.6	
D4	neutral 5			48.4		1.5		-1.4	
E4	neutral 3.5			33.7		0.2		-2.1	
F4	black			17.9		-0.9		-2.1	
A5	paper white			94.8		0.4		-3.8	
B5	Skin highlight L*=88			85.0		10.8		9.9	
C5	Skin highlight L* =75			72.3		18.9		16.3	
D5	Skin shadow L*=28			23.8		15.8		15.7	
E5	Skin shadow L*=13			14.0		11.5		6.0	
F5	Maximum Black			4.2		-0.1		-2.9	
<b>Summary Results</b>		I* Color	I* tone	$\Delta E$	<b>180 Megalux hours</b>				
Average Score for all patches									
Worst 10% (3 lowest scoring patches)									