Aardenburg

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IMAGING & ARCHIVES

Accelerated Light Fading Test Results

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

Sample # AaI_20080502_SN004

220 Megalux-hours completed

Conservation Display Rating *	
Lower Exposure Limit (Megalux hours)	Upper Exposure limit (Megalux hours)
7	23

* 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 an explanation of the conservation display ratings.

Document #: AaI_20080502_SN004Lf.pdf   Rev: October 3, 2012
Test Print Prepared by: Aardenburg Imaging & Archives

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About this Report

This report contains light fastness information about a single 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 2). 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 the Test Results

AaI_StandardColorSet(v2)forSRGB.tif

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 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 presentation of the target images simulates looking at the light-exposed print along side a perfect duplicate of the unexposed original print. The "Before/After" Layer mode takes advantage of Adobe Reader Layer technology. Toggle the "Before/After" layer on and off using the layers feature of Adobe Reader to directly switch between the light exposed print colors and the initial print colors for the image located on the right side of each page. 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, ΔE.* Note that ΔE values lose perceptual scaling significance when they become large (e.g., > 15). Also, the ΔE 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. It was a major reason behind the development of the I* metric.

Sample Description

Printer: HP8750
Ink: HP OEM ink (tricolor, blue, gray)
Paper: HP Premium Plus Photo Satin

Sample #: AaI_20080502_SN004
Test Print Prepared by: AaI&A
Membership category: n.a

Test Image: AaI_StandardColorSet(v2)forSRGB.tif
RIP/Driver settings: PSCS3/HP OEM driver, Quality = Best, Application managed color
Media Setting: "hp premium plus photo paper"

Printed: May 3, 2008
Original print colors measured on: May 09, 2008
Test started on: May 10, 2008

AaI_StandardColorSet(v2)forSRGB.tif

Profile: AaI_HP8750_hpprplphsatin.icc   **Rendering Intent:** Perceptual
Profile type: custom
Profile Creation Software: Gretag/Macbeth Profilemaker 5.0.8

Paper White Color (UV–included versus UV–excluded) and Maximum Printed Black						
Optical Brighteners present? yes**	L*		a*		b*	
	UV inc	UV exc	UV inc	UV exc	UV inc	UV exc
Maximum Paper White (no colorants printed)	94.3	94.3	-0.7	-1.0	-2.0	-0.7
(1) ΔL*, Δa*, Δb* respectively	0.0		0.3		1.3	
(1) Calculated differences, especially for Δb*, indicate the role and magnitude of fluorescence on original paper color						
Maximum Printed black (UV included)	L* = 10.7		a* = 0.7		b* = -2.7	

Light Source: Phillips Colortone F40T12/C50
Filter/Glazing: Sample framed under Glass*
Light Exposure Cycle: 8 hours on, 4 hours off, twice per 24 hours
Average Illuminance during "on" cycle: 11,509 Lux
Average Temperature: 23.1°C over full test duration, 24.5°C during light exposure
Average Relative humidity: 58.1%RH full test period, 58.8%RH during light exposure
CIELAB measurements: D50 2˙ observer, Xrite Gretag/Macbeth Spectrolino/Spectroscan

Replicates/Compare to:

No Replicates are available at this time.

Notes/Comments:

* The Phillips Colortone F40T12/C50 fluorescent light source and ordinary glass picture frame glazing yields UVA content and overall spectral power similar to natural 5000°K daylight entering a window and then striking a print that has been framed by **standard acrylic glazing** rather than ordinary glass. Other light sources and/or different glazing options may yield greater or lesser fade rates (generally, a 2-5x increase in fade rate for direct sunlight compared to UV–excluded sources at the same Lux level). The spectral quality of the light can also affect individual colors differently.

**   OBAs in paper core and verso of print, not in image receiver coating.

December 20, 2008 – 40 Megalux-hours: October comments still valid for I* color, but we are beginning to see more drop in I* tone. System is well balanced and doing relatively well compared to other dye-based printer/ink/media combinations in test.

October 20, 2008 – 30 Megalux-hours: Compare the 20 megalux-hour data to 30 megalux-hour data. The relatively flat response suggests that subtle amounts of continuing dye migration may be offsetting subtle amounts of light-induced fading. The system remains relatively unchanged in color and tonal accuracy over this 10 Mlux-hr interval of light exposure. As noted previously, humidity-induced color and tonal changes tend to cause slight increases rather than decreases in density as well as increases rather than decreases in chroma whereas light induced changes to tend to decrease density and chroma in inkjet prints Thus, simultaneous occurrences of both can potentially cancel each other, at least initially. However, dye migration diminishes over time and has less total impact than light fading, so the continuing light fading will eventually dominate the final scores in this test.

August 25, 2008 – 20 Megalux-hours: As further evidence of the initial settling properties described above, note how the rate of change between 10 and 20 megalux-hour results has slowed significantly compared to the rate of change that occurred between start of test and the 10 megalux-hour mark.

July 8, 2008 – 10 Megalux-hours: Carefully note the darkening (decrease in L* values) with maximum black and other dark colors. These color and tonal changes are not the result of the light fade cycle, rather the result of continued solvent evaporation, dye diffusion, and humidity related effects affecting the image surface characteristics. Hp Premium Plus Photo Satin uses a swellable polymer image receiver coating. Dye-based inkjet prints are prone to long drying periods where colors continue to "settle" out. Often called "short term drift" which makes color profiling a challenge, the drift is compounded by changes in humidity. Moderate to high humidity can cause swellable polymers to exceed glass transition temperature (Tg) which promotes further migration of the dyes and changes in surface gloss. The result is sometimes manifested as darkening and increased contrast in the print with colors often increasing in chroma as well, while in more extreme cases loss of sharpness also occurs. In this test, the print was made in April, 2008 at Aardenburg Imaging and allowed to dry for about one week prior to measurement. At that time of the season, humidity conditions in the print lab and print storage areas were running between 40-55% RH. During the light fade test, RH is maintained in close tolerance to 60% RH and by July when these 10 Megalux-hour exposure measurements were made, the print lab is now in the 60-70% range. Short term drift rather than light induced effects is the most likely cause for the darker colors to be shifting towards lower L* values. Another dark stored print made with same materials at the same time has undergone the same "transformation" in the darker colors. AaI&A uses independent dual measurement methods as a quality control check against instrument and operator errors. It is highly unlikely that the recorded changes were caused by a measurement problem.

AaI&A will follow up on this specific printer/ink/media test by subjecting another sample of this batch to light fade testing. The "dry down" effects will have been accounted for more fully by the prolonged dark storage event, and the replicate test may reveal a "truer" more isolated light fade signature.

Table to Convert Megalux-hours of Light Exposure to estimated "Years on Display"													
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 the light exposure test 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 print display 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 humidity cycling can cause physical cracks and/or flaking, etc. Handling damage such as scratching, abrasion, tears and creases, and catastrophic damage by smoke, fire, flood, etc., also degrade print quality over time. Thus, as illumination levels are reduced other forms of degradation take on greater proportion of risk and may appear in shorter time intervals.

(1) Eastman Kodak has cited this exposure condition and 90% confidence limit as a rationale for estimating print fading times of traditional color photo materials in typical home display environments. For recent light fading claims regarding its line of pigment-based inkjet printers, Kodak has 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) has standardized its light fastness ratings on 450 lux for 12 hours per day in order to estimate the years on display necessary to reach "noticeable" fading. This average light exposure condition, an assumed 75°F/60%RH temperature and humidity level, and WIR's visually weighted densitometric endpoint criteria set V3.0 has become a de facto industry standard for most predictive light fading estimates in the absence of a published International Standards Organization (ISO) test standard.

100_{color}/100_{tone}
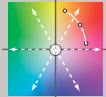
Original Print Colors
(measured before light exposure)
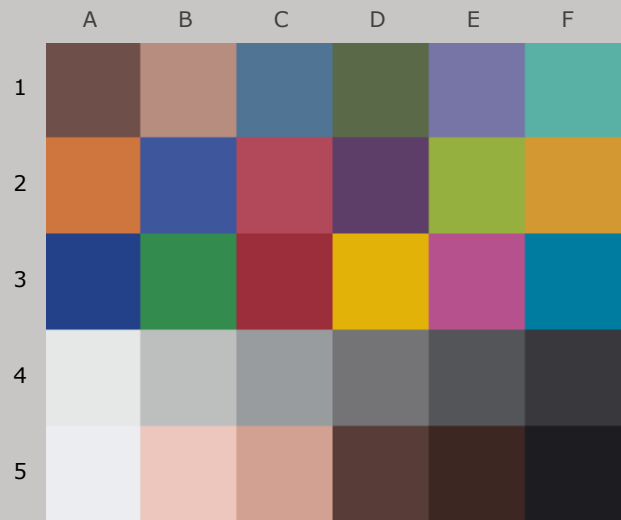
Colors at Zero Megalux-hours of Light Exposure
(same as original print colors)

HP8750, HP OEM Ink (tricolor, blue, gray), HP Premium Plus Photo Satin

Original Print Colors as Measured and at Start of Test

				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	100	0.0	36.7		13.0		7.8	
B1	light Skin	100	0.0	62.5		14.8		13.9	
C1	blue sky	100	0.0	47.2		-5.6		-22.3	
D1	foliage	100	0.0	42.6		-11.4		17.2	
E1	blue flower	100	0.0	50.9		9.1		-25.5	
F1	bluish green	100	0.0	66.6		-30.3		-2.5	
A2	orange	100	0.0	59.0		31.8		46.2	
B2	purplish blue	100	0.0	37.5		8.0		-42.5	
C2	moderate red	100	0.0	46.0		44.1		12.1	
D2	purple	100	0.0	31.0		20.2		-20.0	
E2	yellow green	100	0.0	68.2		-22.5		53.3	
F2	orange yellow	100	0.0	67.6		16.6		58.5	
A3	blue	100	0.0	28.5		8.8		-44.5	
B3	green	100	0.0	51.2		-37.6		24.6	
C3	red	100	0.0	37.0		47.5		19.7	
D3	yellow	100	0.0	75.2		9.0		75.7	
E3	magenta	100	0.0	49.3		46.7		-13.4	
F3	cyan	100	0.0	47.2		-23.2		-28.5	
A4	white	100	0.0	91.6		-0.7		0.5	
B4	neutral 8	100	0.0	77.4		-1.1		-0.2	
C4	neutral 6.5	100	0.0	64.4		-0.7		-0.9	
D4	neutral 5	100	0.0	49.1		0.2		-1.2	
E4	neutral 3.5	100	0.0	36.0		0.3		-2.0	
F4	black	100	0.0	23.6		0.8		-2.7	
A5	paper white	100	0.0	93.8		-0.4		-1.7	
B5	skin highlight L*=89	100	0.0	83.3		12.9		9.6	
C5	skin highlight L*=75	100	0.0	70.7		17.4		15.1	
D5	skin shadow L*=25	100	0.0	28.2		12.0		8.3	
E5	skin shadow L*=11	100	0.0	18.4		10.4		7.0	
F5	Max Black	100	0.0	10.7		0.7		-2.7	

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	100	100	0.0
Average Score for the Worst 10% (3 lowest scoring patches)	100	100	0.0

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91.7$_{color}$/92.8$_{tone}$

	A	B	C	D	E	F
1						
2						
3						
4						
5						

Original Print Colors
(measured before light exposure)

	A	B	C	D	E	F
1						
2						
3						
4						
5						
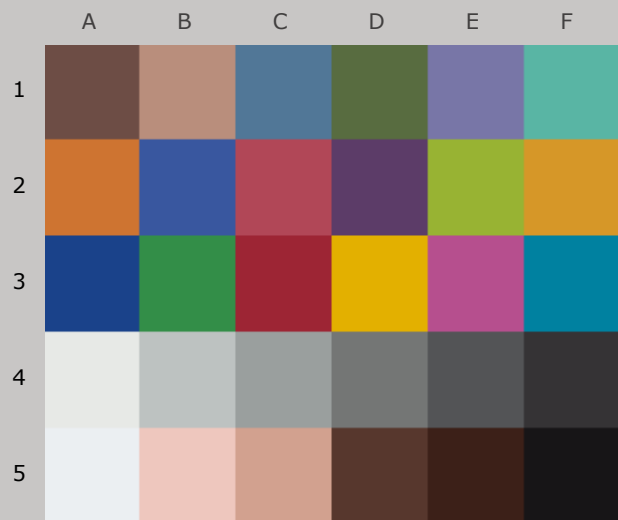
Colors after 10 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

10 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	85.7	2.8	36.7	36.0	13.0	13.5	7.8	10.4
B1	light Skin	89.7	2.6	62.5	62.6	14.8	14.8	13.9	16.5
C1	blue sky	94.7	2.0	47.2	48.2	-5.6	-7.2	-22.3	-21.6
D1	foliage	77.7	5.1	42.6	43.3	-11.4	-13.5	17.2	21.8
E1	blue flower	100.0	0.5	50.9	51.4	9.1	9.2	-25.5	-25.7
F1	bluish green	91.4	3.3	66.6	67.8	-30.3	-31.5	-2.5	0.4
A2	orange	92.4	4.8	59.0	58.6	31.8	33.1	46.2	50.8
B2	purplish blue	99.6	0.7	37.5	37.7	8.0	7.3	-42.5	-42.8
C2	moderate red	96.0	2.4	46.0	45.4	44.1	45.4	12.1	14.1
D2	purple	97.8	1.2	31.0	30.5	20.2	21.3	-20.0	-20.1
E2	yellow green	92.3	5.0	68.2	68.9	-22.5	-22.0	53.3	58.2
F2	orange yellow	92.9	4.8	67.6	67.4	16.6	17.8	58.5	63.2
A3	blue	99.7	0.7	28.5	28.7	8.8	8.3	-44.5	-44.9
B3	green	90.4	5.0	51.2	52.5	-37.6	-39.5	24.6	29.0
C3	red	92.3	4.6	37.0	35.9	47.5	50.0	19.7	23.3
D3	yellow	93.5	5.5	75.2	75.1	9.0	10.3	75.7	81.0
E3	magenta	97.8	1.7	49.3	48.9	46.7	48.2	-13.4	-13.9
F3	cyan	94.1	3.0	47.2	48.5	-23.2	-25.7	-28.5	-27.5
A4	white	100.0	0.6	91.6	92.1	-0.7	-1.0	0.5	0.7
B4	neutral 8	97.9	1.0	77.4	78.2	-1.1	-1.6	-0.2	0.3
C4	neutral 6.5	94.0	1.2	64.4	64.9	-0.7	-1.6	-0.9	-0.3
D4	neutral 5	92.0	1.3	49.1	49.2	0.2	-0.7	-1.2	-0.3
E4	neutral 3.5	91.3	1.4	36.0	35.5	0.3	-0.2	-2.0	-0.8
F4	black	86.4	2.7	23.6	21.6	0.8	0.9	-2.7	-0.9
A5	paper white	100.0	0.4	93.8	94.1	-0.4	-0.5	-1.7	-1.8
B5	skin highlight L*=89	99.4	0.6	83.3	83.4	12.9	12.7	9.6	10.1
C5	skin highlight L*=75	92.9	2.1	70.7	70.7	17.4	17.3	15.1	17.2
D5	skin shadow L*=25	74.5	4.5	28.2	26.6	12.0	13.8	8.3	12.1
E5	skin shadow L*=11	57.6	6.3	18.4	16.0	10.4	13.4	7.0	12.0
F5	Max Black	87.2	4.1	10.7	6.9	0.7	1.5	-2.7	-1.1

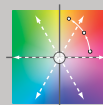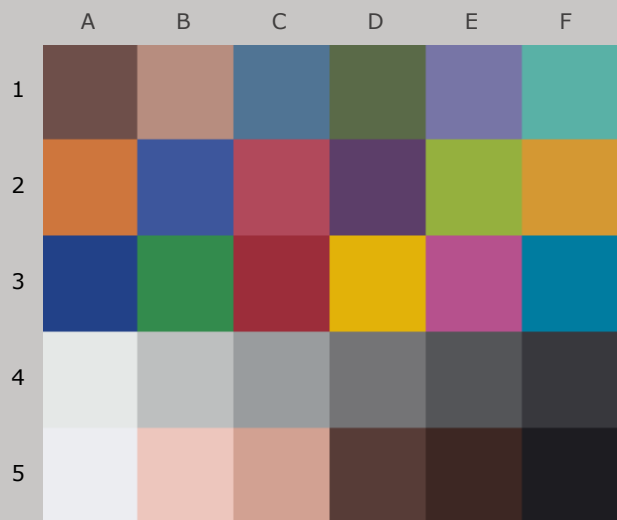| Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	91.7	92.8	2.7
Average Score for the Worst 10% (3 lowest scoring patches)	69.9	84.3	5.6

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Original Print Colors
(measured before light exposure)
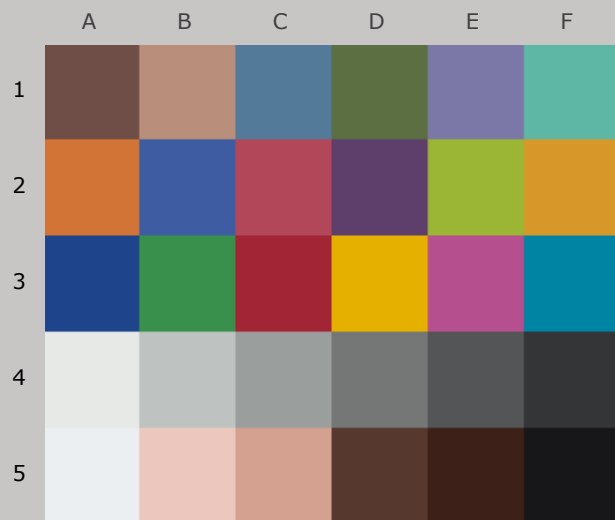
Colors after 20 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
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20 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	87.5	2.4	36.7	36.6	13.0	13.2	7.8	10.2
B1	light Skin	89.1	2.7	62.5	62.9	14.8	15.1	13.9	16.6
C1	blue sky	91.1	3.4	47.2	49.4	-5.6	-7.9	-22.3	-21.2
D1	foliage	77.3	5.4	42.6	44.2	-11.4	-13.8	17.2	21.8
E1	blue flower	100.0	1.4	50.9	52.3	9.1	8.7	-25.5	-25.4
F1	bluish green	90.6	3.8	66.6	68.5	-30.3	-31.7	-2.5	0.5
A2	orange	92.9	4.5	59.0	58.9	31.8	33.5	46.2	50.4
B2	purplish blue	96.0	2.8	37.5	39.1	8.0	5.8	-42.5	-42.0
C2	moderate red	96.8	2.0	46.0	45.7	44.1	45.5	12.1	13.5
D2	purple	97.4	1.3	31.0	31.5	20.2	21.4	-20.0	-20.1
E2	yellow green	93.2	4.7	68.2	69.7	-22.5	-21.8	53.3	57.6
F2	orange yellow	93.4	4.5	67.6	67.7	16.6	18.3	58.5	62.7
A3	blue	96.7	2.4	28.5	29.9	8.8	6.8	-44.5	-44.5
B3	green	91.6	4.8	51.2	53.5	-37.6	-39.4	24.6	28.5
C3	red	91.6	4.8	37.0	36.7	47.5	50.7	19.7	23.2
D3	yellow	93.8	5.2	75.2	75.4	9.0	10.7	75.7	80.6
E3	magenta	97.6	1.7	49.3	49.0	46.7	48.1	-13.4	-14.2
F3	cyan	91.6	4.4	47.2	49.7	-23.2	-26.7	-28.5	-27.4
A4	white	100.0	0.6	91.6	92.1	-0.7	-0.9	0.5	0.7
B4	neutral 8	97.9	1.2	77.4	78.4	-1.1	-1.6	-0.2	0.4
C4	neutral 6.5	91.8	1.6	64.4	65.3	-0.7	-1.8	-0.9	-0.2
D4	neutral 5	86.3	1.9	49.1	49.6	0.2	-1.4	-1.2	-0.3
E4	neutral 3.5	85.7	1.9	36.0	36.0	0.3	-1.2	-2.0	-0.9
F4	black	86.4	2.4	23.6	22.0	0.8	0.0	-2.7	-1.1
A5	paper white	100.0	0.3	93.8	94.0	-0.4	-0.6	-1.7	-1.9
B5	skin highlight L*=89	98.2	0.8	83.3	83.3	12.9	12.5	9.6	10.2
C5	skin highlight L*=75	92.7	2.2	70.7	70.7	17.4	17.5	15.1	17.3
D5	skin shadow L*=25	78.9	3.8	28.2	27.0	12.0	13.3	8.3	11.7
E5	skin shadow L*=11	60.9	5.7	18.4	16.5	10.4	13.1	7.0	11.6
F5	Max Black	87.3	3.6	10.7	7.5	0.7	1.4	-2.7	-1.1

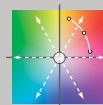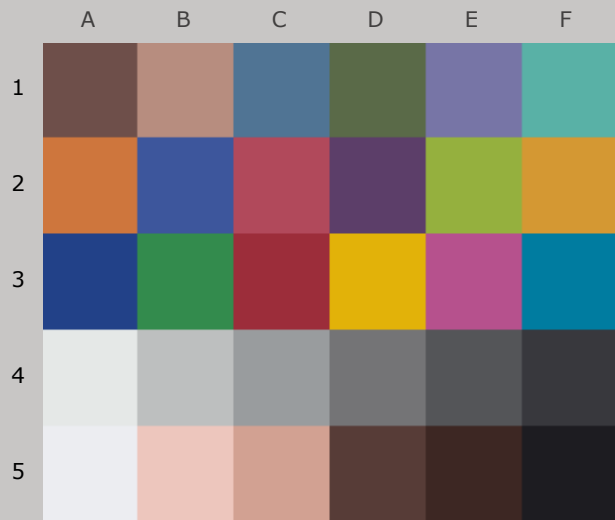| Summary Results	I*Color	I*tone	ΔE		
Average Score for all patches	91.1	90.3	2.9		Aardenburg Imaging
Average Score for the Worst 10% (3 lowest scoring patches)	72.4	76.6	5.5		& Archives

91.8 color / 89.4 tone

Original Print Colors
(measured before light exposure)

Colors after 30 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

30 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	89.0	2.3	36.7	37.5	13.0	13.1	7.8	9.9
B1	light Skin	88.9	2.9	62.5	63.3	14.8	15.4	13.9	16.6
C1	blue sky	88.3	4.6	47.2	50.5	-5.6	-8.4	-22.3	-20.9
D1	foliage	79.5	5.4	42.6	45.2	-11.4	-13.2	17.2	21.6
E1	blue flower	98.3	2.5	50.9	53.2	9.1	8.2	-25.5	-25.1
F1	bluish green	91.2	4.0	66.6	69.1	-30.3	-31.4	-2.5	0.5
A2	orange	92.9	4.5	59.0	59.4	31.8	34.0	46.2	50.1
B2	purplish blue	92.0	5.0	37.5	40.5	8.0	4.2	-42.5	-41.2
C2	moderate red	96.6	2.1	46.0	46.3	44.1	45.6	12.1	13.4
D2	purple	98.7	2.2	31.0	33.0	20.2	20.9	-20.0	-19.5
E2	yellow green	94.3	4.5	68.2	70.5	-22.5	-21.5	53.3	57.0
F2	orange yellow	95.1	3.5	67.6	68.4	16.6	18.6	58.5	61.3
A3	blue	93.4	4.7	28.5	31.6	8.8	5.4	-44.5	-43.8
B3	green	94.1	4.7	51.2	54.7	-37.6	-39.2	24.6	27.3
C3	red	92.1	4.7	37.0	38.0	47.5	50.9	19.7	22.7
D3	yellow	95.3	4.2	75.2	76.2	9.0	10.7	75.7	79.5
E3	magenta	97.9	1.5	49.3	49.5	46.7	47.9	-13.4	-14.3
F3	cyan	91.2	5.3	47.2	51.0	-23.2	-26.8	-28.5	-27.4
A4	white	100.0	0.9	91.6	92.4	-0.7	-0.9	0.5	0.7
B4	neutral 8	98.0	1.6	77.4	78.9	-1.1	-1.3	-0.2	0.5
C4	neutral 6.5	92.2	2.1	64.4	66.1	-0.7	-1.7	-0.9	-0.1
D4	neutral 5	83.9	2.5	49.1	50.5	0.2	-1.6	-1.2	-0.2
E4	neutral 3.5	81.3	2.5	36.0	37.0	0.3	-1.7	-2.0	-1.0
F4	black	85.8	1.9	23.6	23.4	0.8	-0.6	-2.7	-1.5
A5	paper white	100.0	0.6	93.8	94.3	-0.4	-0.6	-1.7	-1.7
B5	skin highlight L*=89	99.3	0.7	83.3	83.7	12.9	12.4	9.6	9.9
C5	skin highlight L*=75	93.7	2.0	70.7	71.3	17.4	17.9	15.1	17.0
D5	skin shadow L*=25	86.3	2.5	28.2	28.4	12.0	12.8	8.3	10.7
E5	skin shadow L*=11	71.5	4.1	18.4	18.2	10.4	12.7	7.0	10.4
F5	Max Black	92.9	1.3	10.7	10.2	0.7	0.8	-2.7	-1.5

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	91.8	89.4	3.0
Average Score for the Worst 10% (3 lowest scoring patches)	77.4	70.9	5.2

Aardenburg Imaging & Archives
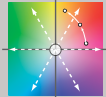
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92.4$_{\text{color}}$ /87.9$_{\text{tone}}$

Original Print Colors
(measured before light exposure)

Colors after 40 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

40 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	94.4	1.9	36.7	38.0	13.0	13.3	7.8	9.1
B1	light Skin	92.3	2.4	62.5	63.7	14.8	15.8	13.9	15.6
C1	blue sky	87.2	5.4	47.2	51.4	-5.6	-8.8	-22.3	-21.0
D1	foliage	85.7	4.8	42.6	46.0	-11.4	-13.0	17.2	20.2
E1	blue flower	97.3	3.1	50.9	53.8	9.1	7.9	-25.5	-25.1
F1	bluish green	95.6	3.6	66.6	69.7	-30.3	-31.3	-2.5	-1.0
A2	orange	95.2	3.3	59.0	59.8	31.8	34.3	46.2	48.2
B2	purplish blue	89.9	6.2	37.5	41.4	8.0	3.4	-42.5	-40.9
C2	moderate red	96.7	2.1	46.0	46.7	44.1	46.1	12.1	12.1
D2	purple	98.5	2.9	31.0	33.8	20.2	20.9	-20.0	-19.4
E2	yellow green	96.9	3.8	68.2	71.3	-22.5	-21.7	53.3	55.4
F2	orange yellow	95.3	3.5	67.6	68.7	16.6	19.0	58.5	60.8
A3	blue	91.4	5.9	28.5	32.4	8.8	4.5	-44.5	-43.5
B3	green	96.0	4.8	51.2	55.4	-37.6	-39.0	24.6	26.4
C3	red	90.7	5.5	37.0	38.7	47.5	51.6	19.7	22.9
D3	yellow	95.7	4.0	75.2	76.5	9.0	10.9	75.7	78.9
E3	magenta	97.0	2.0	49.3	49.7	46.7	48.2	-13.4	-14.6
F3	cyan	90.5	6.1	47.2	51.7	-23.2	-27.1	-28.5	-27.5
A4	white	100.0	1.0	91.6	92.6	-0.7	-0.9	0.5	0.6
B4	neutral 8	98.5	1.9	77.4	79.2	-1.1	-1.0	-0.2	0.4
C4	neutral 6.5	94.5	2.3	64.4	66.4	-0.7	-1.4	-0.9	-0.1
D4	neutral 5	85.1	2.6	49.1	50.8	0.2	-1.5	-1.2	-0.3
E4	neutral 3.5	80.3	2.7	36.0	37.4	0.3	-1.9	-2.0	-1.1
F4	black	84.5	2.0	23.6	23.8	0.8	-0.9	-2.7	-1.7
A5	paper white	100.0	0.8	93.8	94.5	-0.4	-0.6	-1.7	-1.7
B5	skin highlight L*=89	100.0	0.7	83.3	83.9	12.9	12.4	9.6	9.5
C5	skin highlight L*=75	94.7	1.9	70.7	71.5	17.4	18.1	15.1	16.7
D5	skin shadow L*=25	85.8	2.7	28.2	28.9	12.0	13.2	8.3	10.6
E5	skin shadow L*=11	68.3	4.5	18.4	18.6	10.4	13.1	7.0	10.6
F5	Max Black	93.4	1.1	10.7	10.9	0.7	0.6	-2.7	-1.5

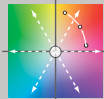| Summary Results	I*Color	I*tone	ΔE	
Average Score for all patches	92.4	87.9	3.2	
Average Score for the Worst 10% (3 lowest scoring patches)	77.7	66.3	6.1	Aardenburg Imaging & Archives

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Original Print Colors
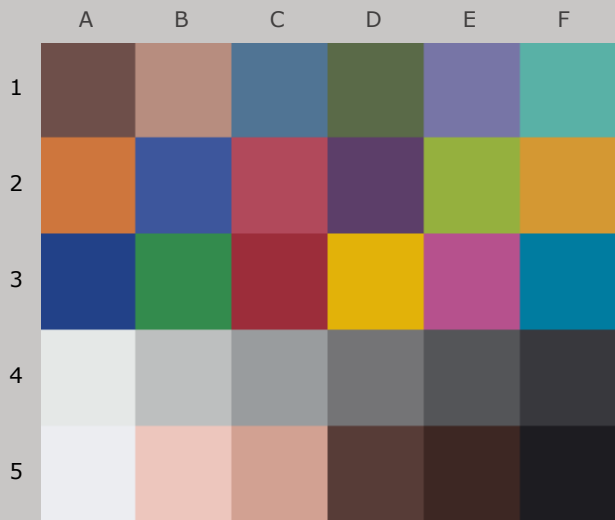(measured before light exposure)

Colors after 50 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

50 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	96.0	2.1	36.7	38.5	13.0	13.8	7.8	8.6
B1	light Skin	93.2	2.4	62.5	64.1	14.8	16.4	13.9	14.9
C1	blue sky	86.2	6.2	47.2	52.2	-5.6	-9.0	-22.3	-21.1
D1	foliage	90.5	4.8	42.6	46.7	-11.4	-12.6	17.2	19.3
E1	blue flower	96.5	3.8	50.9	54.4	9.1	7.7	-25.5	-25.1
F1	bluish green	99.0	3.7	66.6	70.2	-30.3	-31.0	-2.5	-2.1
A2	orange	96.2	2.9	59.0	60.2	31.8	34.4	46.2	46.5
B2	purplish blue	87.6	7.6	37.5	42.3	8.0	2.4	-42.5	-40.6
C2	moderate red	95.0	3.0	46.0	47.2	44.1	46.6	12.1	10.8
D2	purple	98.1	3.8	31.0	34.6	20.2	21.1	-20.0	-19.4
E2	yellow green	99.7	4.0	68.2	72.1	-22.5	-21.9	53.3	53.7
F2	orange yellow	96.7	3.0	67.6	69.3	16.6	19.0	58.5	59.2
A3	blue	89.5	7.2	28.5	33.4	8.8	3.7	-44.5	-43.3
B3	green	97.9	5.4	51.2	56.4	-37.6	-39.0	24.6	24.7
C3	red	90.4	6.0	37.0	39.6	47.5	52.3	19.7	22.3
D3	yellow	97.7	3.0	75.2	77.1	9.0	10.5	75.7	77.4
E3	magenta	96.1	2.5	49.3	50.0	46.7	48.4	-13.4	-15.0
F3	cyan	90.2	6.8	47.2	52.6	-23.2	-27.3	-28.5	-27.7
A4	white	100.0	1.1	91.6	92.7	-0.7	-0.8	0.5	0.7
B4	neutral 8	96.9	2.3	77.4	79.6	-1.1	-0.6	-0.2	0.4
C4	neutral 6.5	97.8	2.6	64.4	66.9	-0.7	-1.0	-0.9	-0.2
D4	neutral 5	88.0	2.7	49.1	51.3	0.2	-1.3	-1.2	-0.5
E4	neutral 3.5	81.5	2.9	36.0	37.8	0.3	-1.8	-2.0	-1.4
F4	black	85.5	1.9	23.6	24.1	0.8	-0.9	-2.7	-1.9
A5	paper white	100.0	0.8	93.8	94.5	-0.4	-0.6	-1.7	-1.5
B5	skin highlight L*=89	99.2	0.9	83.3	84.0	12.9	12.5	9.6	9.1
C5	skin highlight L*=75	95.6	1.9	70.7	71.8	17.4	18.5	15.1	16.2
D5	skin shadow L*=25	85.7	2.9	28.2	29.5	12.0	13.7	8.3	10.3
E5	skin shadow L*=11	66.8	4.7	18.4	19.3	10.4	13.6	7.0	10.4
F5	Max Black	92.9	1.2	10.7	11.1	0.7	0.5	-2.7	-1.5

Summary Results	I*Color	I*tone	ΔE	
Average Score for all patches	92.9	85.9	3.5	
Average Score for the Worst 10% (3 lowest scoring patches)	77.9	61.8	7.2	

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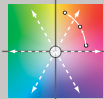Original Print Colors
(measured before light exposure)

Colors after 60 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	91.3	2.9	36.7	38.9	13.0	14.1	7.8	9.2
B1	light Skin	90.5	3.1	62.5	64.4	14.8	16.7	13.9	15.3
C1	blue sky	84.2	7.0	47.2	52.8	-5.6	-9.4	-22.3	-20.8
D1	foliage	88.7	5.5	42.6	47.3	-11.4	-12.1	17.2	19.9
E1	blue flower	95.1	4.5	50.9	55.0	9.1	7.5	-25.5	-24.8
F1	bluish green	99.8	4.1	66.6	70.7	-30.3	-30.8	-2.5	-2.2
A2	orange	95.4	3.5	59.0	60.6	31.8	34.7	46.2	47.5
B2	purplish blue	85.1	9.0	37.5	43.1	8.0	1.5	-42.5	-40.0
C2	moderate red	95.0	3.2	46.0	47.6	44.1	46.8	12.1	11.5
D2	purple	96.7	4.6	31.0	35.4	20.2	21.2	-20.0	-19.0
E2	yellow green	98.5	4.7	68.2	72.6	-22.5	-21.5	53.3	54.2
F2	orange yellow	95.8	3.7	67.6	69.6	16.6	19.3	58.5	60.0
A3	blue	87.4	8.5	28.5	34.3	8.8	2.8	-44.5	-42.9
B3	green	98.4	5.9	51.2	57.0	-37.6	-38.7	24.6	25.2
C3	red	88.5	7.2	37.0	40.3	47.5	52.6	19.7	23.5
D3	yellow	96.8	3.7	75.2	77.4	9.0	10.7	75.7	78.1
E3	magenta	96.1	2.6	49.3	50.3	46.7	48.6	-13.4	-14.7
F3	cyan	89.5	7.4	47.2	53.2	-23.2	-27.5	-28.5	-27.5
A4	white	100.0	1.3	91.6	92.9	-0.7	-0.7	0.5	0.9
B4	neutral 8	92.7	2.8	77.4	79.9	-1.1	-0.3	-0.2	0.7
C4	neutral 6.5	95.8	3.0	64.4	67.2	-0.7	-0.5	-0.9	0.0
D4	neutral 5	90.4	2.9	49.1	51.7	0.2	-0.9	-1.2	-0.3
E4	neutral 3.5	82.7	3.0	36.0	38.2	0.3	-1.7	-2.0	-1.2
F4	black	85.1	2.1	23.6	24.5	0.8	-0.9	-2.7	-1.7
A5	paper white	98.1	1.1	93.8	94.6	-0.4	-0.6	-1.7	-1.1
B5	skin highlight L*=89	99.3	1.0	83.3	84.2	12.9	12.5	9.6	9.2
C5	skin highlight L*=75	94.2	2.3	70.7	72.1	17.4	18.7	15.1	16.4
D5	skin shadow L*=25	81.6	3.7	28.2	30.1	12.0	14.1	8.3	10.7
E5	skin shadow L*=11	62.9	5.4	18.4	20.0	10.4	14.0	7.0	10.7
F5	Max Black	93.9	1.5	10.7	11.7	0.7	0.4	-2.7	-1.6

Summary Results	I*Color	I*tone	ΔE		
Average Score for all patches	91.7	84.6	4.0		
Average Score for the Worst 10% (3 lowest scoring patches)	75.7	59.4	8.3		

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& Archives

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$90.2_{color}/83.5_{tone}$

	A	B	C	D	E	F
1						
2						
3						
4						
5						

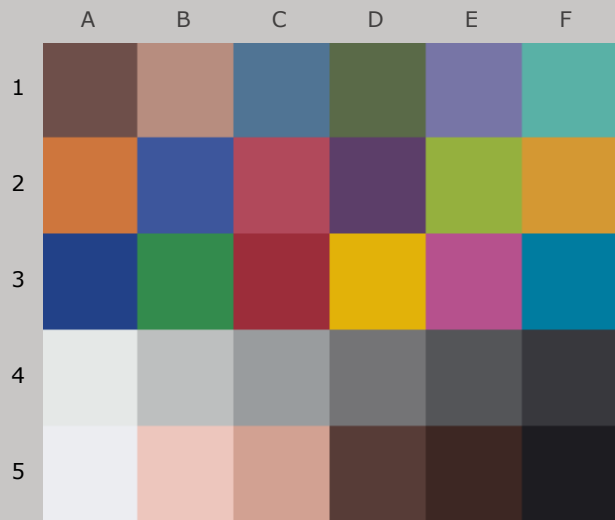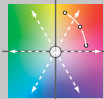Original Print Colors
(measured before light exposure)

Colors after 70 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

70 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	86.2	3.6	36.7	39.2	13.0	14.9	7.8	9.6
B1	light Skin	88.4	3.6	62.5	64.7	14.8	17.3	13.9	15.2
C1	blue sky	83.3	7.7	47.2	53.5	-5.6	-9.6	-22.3	-20.7
D1	foliage	86.6	6.0	42.6	47.7	-11.4	-11.6	17.2	20.4
E1	blue flower	94.4	5.0	50.9	55.5	9.1	7.3	-25.5	-24.5
F1	bluish green	100.0	4.5	66.6	71.2	-30.3	-30.4	-2.5	-2.7
A2	orange	94.6	4.1	59.0	61.0	31.8	34.9	46.2	48.0
B2	purplish blue	83.2	10.0	37.5	43.8	8.0	0.7	-42.5	-39.8
C2	moderate red	93.5	3.9	46.0	47.9	44.1	47.5	12.1	11.6
D2	purple	95.4	5.2	31.0	35.8	20.2	21.7	-20.0	-19.0
E2	yellow green	97.7	5.4	68.2	73.2	-22.5	-21.0	53.3	54.4
F2	orange yellow	95.0	4.4	67.6	70.1	16.6	19.5	58.5	60.6
A3	blue	86.0	9.4	28.5	34.9	8.8	2.1	-44.5	-42.9
B3	green	98.4	6.4	51.2	57.5	-37.6	-38.6	24.6	25.3
C3	red	86.0	8.6	37.0	40.9	47.5	53.3	19.7	24.7
D3	yellow	96.0	4.5	75.2	77.8	9.0	10.8	75.7	78.8
E3	magenta	95.2	3.1	49.3	50.5	46.7	49.2	-13.4	-14.6
F3	cyan	89.1	7.9	47.2	53.7	-23.2	-27.6	-28.5	-27.6
A4	white	98.7	1.5	91.6	93.0	-0.7	-0.6	0.5	1.1
B4	neutral 8	88.9	3.2	77.4	80.3	-1.1	0.2	-0.2	0.7
C4	neutral 6.5	94.0	3.5	64.4	67.7	-0.7	0.1	-0.9	-0.2
D4	neutral 5	97.4	3.0	49.1	52.0	0.2	-0.2	-1.2	-0.6
E4	neutral 3.5	88.7	2.7	36.0	38.3	0.3	-1.1	-2.0	-1.4
F4	black	88.6	1.7	23.6	24.3	0.8	-0.5	-2.7	-1.8
A5	paper white	96.7	1.3	93.8	94.7	-0.4	-0.5	-1.7	-0.9
B5	skin highlight L*=89	99.3	1.2	83.3	84.4	12.9	12.6	9.6	9.0
C5	skin highlight L*=75	93.1	2.8	70.7	72.5	17.4	19.1	15.1	16.3
D5	skin shadow L*=25	73.3	4.9	28.2	30.3	12.0	15.0	8.3	11.6
E5	skin shadow L*=11	46.5	7.4	18.4	20.0	10.4	15.1	7.0	12.4
F5	Max Black	92.3	1.2	10.7	10.8	0.7	0.6	-2.7	-1.4

Summary Results	I*Color	I*tone	ΔE	
Average Score for all patches	90.2	83.5	4.6	
Average Score for the Worst 10% (3 lowest scoring patches)	67.7	57.0	9.3	

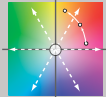Aardenburg Imaging
& Archives

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Original Print Colors
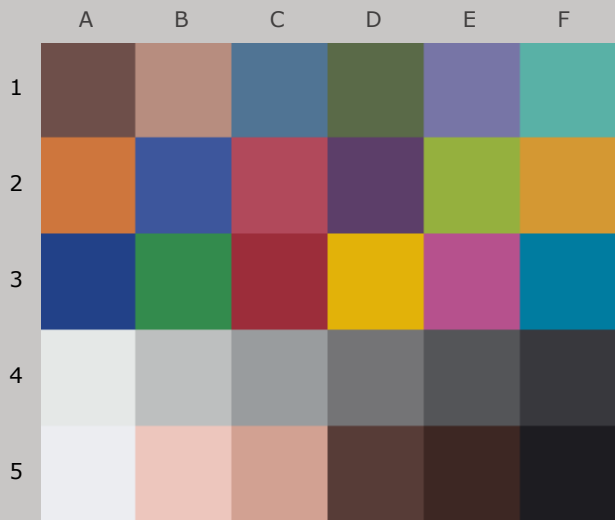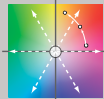(measured before light exposure)

Colors after 80 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

80 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	80.4	4.6	36.7	39.7	13.0	15.5	7.8	10.3
B1	light Skin	85.9	4.4	62.5	65.3	14.8	17.7	13.9	15.6
C1	blue sky	81.3	8.6	47.2	54.4	-5.6	-10.0	-22.3	-20.4
D1	foliage	82.5	7.0	42.6	48.3	-11.4	-11.2	17.2	21.3
E1	blue flower	92.7	5.8	50.9	56.2	9.1	7.0	-25.5	-24.2
F1	bluish green	100.0	5.2	66.6	71.8	-30.3	-30.1	-2.5	-2.9
A2	orange	93.4	4.9	59.0	61.5	31.8	35.1	46.2	48.9
B2	purplish blue	81.0	11.3	37.5	44.6	8.0	-0.1	-42.5	-39.3
C2	moderate red	92.6	4.5	46.0	48.3	44.1	48.0	12.1	12.1
D2	purple	94.1	5.9	31.0	36.5	20.2	22.0	-20.0	-18.7
E2	yellow green	96.7	6.2	68.2	73.9	-22.5	-20.5	53.3	54.7
F2	orange yellow	94.2	5.1	67.6	70.7	16.6	19.5	58.5	61.3
A3	blue	84.3	10.5	28.5	35.6	8.8	1.4	-44.5	-42.6
B3	green	98.2	7.1	51.2	58.1	-37.6	-38.4	24.6	25.7
C3	red	83.4	10.1	37.0	41.6	47.5	53.9	19.7	26.1
D3	yellow	95.2	5.2	75.2	78.4	9.0	10.7	75.7	79.4
E3	magenta	94.6	3.5	49.3	50.8	46.7	49.6	-13.4	-14.4
F3	cyan	88.4	8.5	47.2	54.2	-23.2	-27.9	-28.5	-27.5
A4	white	95.5	1.8	91.6	93.2	-0.7	-0.5	0.5	1.4
B4	neutral 8	84.8	3.8	77.4	80.7	-1.1	0.5	-0.2	0.9
C4	neutral 6.5	89.5	4.0	64.4	68.1	-0.7	0.5	-0.9	0.0
D4	neutral 5	96.9	3.3	49.1	52.3	0.2	0.2	-1.2	-0.4
E4	neutral 3.5	90.9	2.8	36.0	38.4	0.3	-0.8	-2.0	-1.2
F4	black	87.9	1.8	23.6	24.3	0.8	-0.2	-2.7	-1.4
A5	paper white	92.1	1.6	93.8	94.8	-0.4	-0.5	-1.7	-0.5
B5	skin highlight L*=89	99.3	1.3	83.3	84.5	12.9	12.7	9.6	9.0
C5	skin highlight L*=75	92.4	3.1	70.7	72.8	17.4	19.2	15.1	16.4
D5	skin shadow L*=25	64.3	6.2	28.2	30.5	12.0	15.7	8.3	12.7
E5	skin shadow L*=11	31.7	9.2	18.4	20.1	10.4	16.0	7.0	14.0
F5	Max Black	87.4	1.9	10.7	9.8	0.7	0.9	-2.7	-1.0

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	87.7	81.8	5.3
Average Score for the Worst 10% (3 lowest scoring patches)	58.8	54.5	10.6

AARDENBURG IMAGING
& ARCHIVES

	A	B	C	D	E	F
1						
2						
3						
4						
5						

Original Print Colors
(measured before light exposure)

	A	B	C	D	E	F
1						
2						
3						
4						
5						
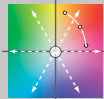
Colors after 90 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

90 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	78.2	5.0	36.7	40.0	13.0	15.9	7.8	10.3
B1	light Skin	85.3	4.6	62.5	65.5	14.8	18.0	13.9	15.3
C1	blue sky	79.8	9.3	47.2	54.9	-5.6	-10.3	-22.3	-20.3
D1	foliage	83.5	7.3	42.6	48.7	-11.4	-10.8	17.2	21.1
E1	blue flower	91.1	6.5	50.9	56.7	9.1	6.6	-25.5	-24.0
F1	bluish green	97.6	5.6	66.6	72.1	-30.3	-29.8	-2.5	-3.6
A2	orange	94.1	4.7	59.0	61.8	31.8	35.0	46.2	48.4
B2	purplish blue	79.0	12.4	37.5	45.3	8.0	-0.9	-42.5	-38.8
C2	moderate red	92.0	4.9	46.0	48.5	44.1	48.3	12.1	11.7
D2	purple	93.4	6.5	31.0	37.1	20.2	22.0	-20.0	-18.5
E2	yellow green	97.4	6.5	68.2	74.4	-22.5	-20.5	53.3	53.7
F2	orange yellow	95.0	4.9	67.6	71.1	16.6	19.3	58.5	60.7
A3	blue	82.6	11.5	28.5	36.3	8.8	0.7	-44.5	-42.3
B3	green	99.6	7.5	51.2	58.6	-37.6	-38.2	24.6	24.8
C3	red	82.7	10.7	37.0	42.2	47.5	53.9	19.7	26.5
D3	yellow	96.0	5.0	75.2	78.7	9.0	10.4	75.7	78.9
E3	magenta	94.1	3.7	49.3	50.9	46.7	49.9	-13.4	-14.4
F3	cyan	88.5	8.8	47.2	54.6	-23.2	-27.8	-28.5	-27.4
A4	white	95.7	1.7	91.6	93.1	-0.7	-0.4	0.5	1.3
B4	neutral 8	83.1	4.0	77.4	80.8	-1.1	0.7	-0.2	0.9
C4	neutral 6.5	86.7	4.3	64.4	68.3	-0.7	0.9	-0.9	-0.1
D4	neutral 5	96.9	3.5	49.1	52.5	0.2	0.6	-1.2	-0.5
E4	neutral 3.5	94.2	2.8	36.0	38.6	0.3	-0.5	-2.0	-1.3
F4	black	89.0	1.7	23.6	24.4	0.8	0.0	-2.7	-1.4
A5	paper white	91.3	1.6	93.8	94.6	-0.4	-0.5	-1.7	-0.4
B5	skin highlight L*=89	96.6	1.6	83.3	84.5	12.9	12.8	9.6	8.5
C5	skin highlight L*=75	92.7	3.1	70.7	72.9	17.4	19.4	15.1	16.0
D5	skin shadow L*=25	61.1	6.8	28.2	31.0	12.0	16.1	8.3	13.0
E5	skin shadow L*=11	28.0	9.8	18.4	20.7	10.4	16.4	7.0	14.4
F5	Max Black	86.7	1.9	10.7	9.9	0.7	0.9	-2.7	-0.9

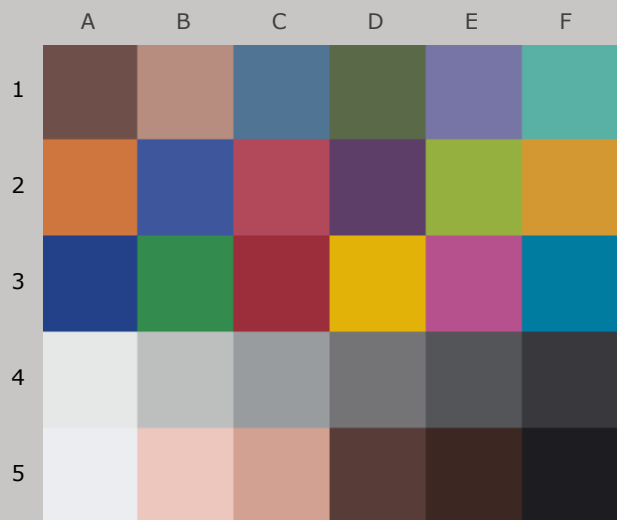| Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	87.1	80.3	5.6
Average Score for the Worst 10% (3 lowest scoring patches)	55.8	51.6	11.6

Aardenburg Imaging & Archives

	A	B	C	D	E	F
1						
2						
3						
4						
5						

Original Print Colors
(measured before light exposure)

	A	B	C	D	E	F
1						
2						
3						
4						
5						

Colors after 100 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray), HP Premium Plus Photo Satin

100 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	78.5	5.5	36.7	40.7	13.0	16.2	7.8	9.8
B1	light Skin	85.5	4.9	62.5	65.9	14.8	18.1	13.9	14.7
C1	blue sky	78.7	10.0	47.2	55.6	-5.6	-10.5	-22.3	-20.1
D1	foliage	86.8	7.7	42.6	49.6	-11.4	-10.5	17.2	20.3
E1	blue flower	89.3	7.2	50.9	57.3	9.1	6.2	-25.5	-23.8
F1	bluish green	95.1	6.2	66.6	72.5	-30.3	-29.5	-2.5	-4.3
A2	orange	95.5	4.5	59.0	62.2	31.8	34.7	46.2	47.0
B2	purplish blue	77.0	13.5	37.5	46.1	8.0	-1.6	-42.5	-38.4
C2	moderate red	91.7	5.2	46.0	49.0	44.1	48.2	12.1	10.9
D2	purple	93.7	7.4	31.0	38.0	20.2	21.8	-20.0	-18.3
E2	yellow green	97.1	7.2	68.2	75.1	-22.5	-20.6	53.3	52.1
F2	orange yellow	96.6	4.8	67.6	71.7	16.6	19.0	58.5	59.5
A3	blue	80.9	12.7	28.5	37.3	8.8	0.1	-44.5	-41.7
B3	green	98.6	8.2	51.2	59.4	-37.6	-38.0	24.6	23.6
C3	red	83.8	10.8	37.0	43.1	47.5	53.7	19.7	25.9
D3	yellow	98.0	4.7	75.2	79.4	9.0	9.9	75.7	77.6
E3	magenta	94.2	3.8	49.3	51.3	46.7	49.8	-13.4	-14.4
F3	cyan	88.8	9.3	47.2	55.2	-23.2	-27.7	-28.5	-27.4
A4	white	94.1	2.0	91.6	93.3	-0.7	-0.4	0.5	1.5
B4	neutral 8	81.5	4.4	77.4	81.2	-1.1	0.8	-0.2	0.9
C4	neutral 6.5	84.0	4.8	64.4	68.8	-0.7	1.2	-0.9	-0.1
D4	neutral 5	95.5	4.1	49.1	53.0	0.2	1.0	-1.2	-0.7
E4	neutral 3.5	99.1	3.3	36.0	39.2	0.3	-0.1	-2.0	-1.6
F4	black	93.9	1.9	23.6	25.2	0.8	0.1	-2.7	-1.8
A5	paper white	88.0	1.9	93.8	94.8	-0.4	-0.5	-1.7	-0.1
B5	skin highlight L*=89	94.0	2.1	83.3	84.8	12.9	12.8	9.6	8.1
C5	skin highlight L*=75	93.3	3.4	70.7	73.4	17.4	19.4	15.1	15.4
D5	skin shadow L*=25	63.2	7.0	28.2	32.0	12.0	16.3	8.3	12.4
E5	skin shadow L*=11	31.9	9.6	18.4	21.7	10.4	16.4	7.0	13.7
F5	Max Black	90.5	1.5	10.7	11.3	0.7	0.6	-2.7	-1.3

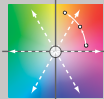| Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	87.3	79.0	6.0
Average Score for the Worst 10% (3 lowest scoring patches)	57.4	49.1	12.3

Aardenburg Imaging & Archives

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Original Print Colors
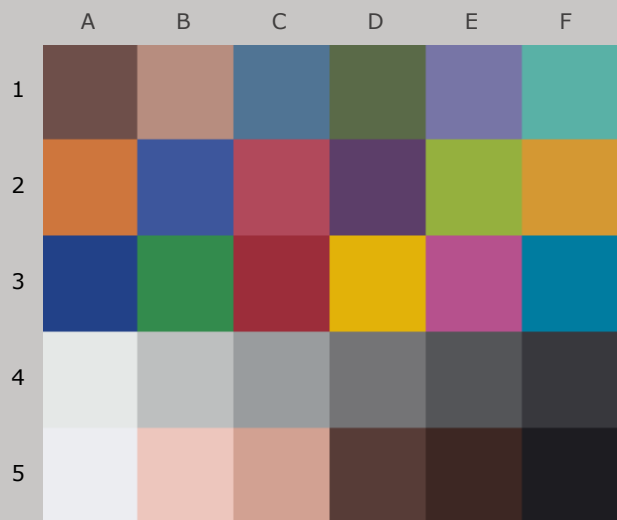(measured before light exposure)

Colors after 110 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

110 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	77.2	6.0	36.7	41.2	13.0	16.5	7.8	9.6
B1	light Skin	85.4	5.1	62.5	66.3	14.8	18.2	13.9	14.2
C1	blue sky	77.3	10.7	47.2	56.3	-5.6	-10.8	-22.3	-20.0
D1	foliage	88.8	8.1	42.6	50.2	-11.4	-10.2	17.2	19.7
E1	blue flower	87.5	7.9	50.9	57.8	9.1	5.8	-25.5	-23.6
F1	bluish green	92.7	6.8	66.6	72.8	-30.3	-29.1	-2.5	-5.0
A2	orange	96.0	4.5	59.0	62.5	31.8	34.5	46.2	45.9
B2	purplish blue	75.2	14.6	37.5	46.8	8.0	-2.2	-42.5	-37.8
C2	moderate red	90.9	5.7	46.0	49.2	44.1	48.4	12.1	10.3
D2	purple	93.2	8.2	31.0	38.8	20.2	21.6	-20.0	-18.0
E2	yellow green	95.5	8.1	68.2	75.7	-22.5	-20.6	53.3	50.8
F2	orange yellow	97.5	5.0	67.6	72.1	16.6	18.6	58.5	58.5
A3	blue	79.3	13.7	28.5	38.0	8.8	-0.5	-44.5	-41.1
B3	green	96.6	9.0	51.2	59.9	-37.6	-37.8	24.6	22.6
C3	red	83.7	11.2	37.0	43.8	47.5	53.7	19.7	26.0
D3	yellow	99.4	4.8	75.2	79.9	9.0	9.4	75.7	76.6
E3	magenta	93.9	4.0	49.3	51.4	46.7	49.9	-13.4	-14.5
F3	cyan	88.8	9.7	47.2	55.7	-23.2	-27.7	-28.5	-27.2
A4	white	93.1	2.1	91.6	93.4	-0.7	-0.4	0.5	1.6
B4	neutral 8	79.9	4.8	77.4	81.6	-1.1	1.0	-0.2	1.0
C4	neutral 6.5	81.7	5.3	64.4	69.2	-0.7	1.4	-0.9	-0.1
D4	neutral 5	91.5	4.4	49.1	53.3	0.2	1.4	-1.2	-0.5
E4	neutral 3.5	100.0	3.6	36.0	39.6	0.3	0.2	-2.0	-1.6
F4	black	94.5	2.2	23.6	25.5	0.8	0.3	-2.7	-1.8
A5	paper white	85.3	2.2	93.8	94.9	-0.4	-0.6	-1.7	0.2
B5	skin highlight L*=89	91.3	2.5	83.3	84.9	12.9	12.8	9.6	7.7
C5	skin highlight L*=75	93.3	3.6	70.7	73.6	17.4	19.4	15.1	15.0
D5	skin shadow L*=25	61.3	7.6	28.2	32.5	12.0	16.6	8.3	12.4
E5	skin shadow L*=11	29.3	10.2	18.4	22.4	10.4	16.7	7.0	13.9
F5	Max Black	89.9	1.8	10.7	11.8	0.7	0.6	-2.7	-1.2

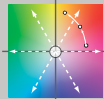| Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	86.3	77.5	6.0
Average Score for the Worst 10% (3 lowest scoring patches)	55.2	45.9	12.3

Aardenburg Imaging & Archives

Original Print Colors
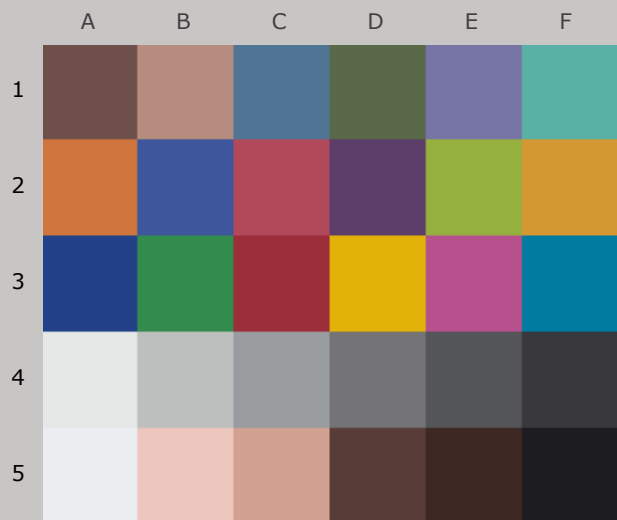(measured before light exposure)

Colors after 120 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

120 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	76.5	6.5	36.7	41.8	13.0	16.8	7.8	9.3
B1	light Skin	84.8	5.5	62.5	66.6	14.8	18.3	13.9	13.5
C1	blue sky	77.0	11.3	47.2	56.8	-5.6	-10.9	-22.3	-20.1
D1	foliage	91.1	8.6	42.6	50.9	-11.4	-9.9	17.2	19.0
E1	blue flower	86.6	8.5	50.9	58.3	9.1	5.5	-25.5	-23.6
F1	bluish green	89.8	7.5	66.6	73.2	-30.3	-28.8	-2.5	-5.8
A2	orange	95.6	5.0	59.0	63.0	31.8	34.2	46.2	44.4
B2	purplish blue	73.9	15.4	37.5	47.4	8.0	-2.7	-42.5	-37.6
C2	moderate red	89.7	6.3	46.0	49.6	44.1	48.5	12.1	9.3
D2	purple	93.2	8.8	31.0	39.5	20.2	21.6	-20.0	-18.0
E2	yellow green	92.6	9.4	68.2	76.3	-22.5	-20.8	53.3	48.8
F2	orange yellow	97.2	5.6	67.6	72.7	16.6	18.0	58.5	56.9
A3	blue	78.0	14.7	28.5	38.7	8.8	-1.0	-44.5	-40.8
B3	green	93.1	10.1	51.2	60.6	-37.6	-37.7	24.6	21.0
C3	red	84.9	11.1	37.0	44.5	47.5	53.6	19.7	25.2
D3	yellow	99.2	5.5	75.2	80.5	9.0	8.5	75.7	74.8
E3	magenta	93.7	4.3	49.3	51.8	46.7	50.0	-13.4	-14.7
F3	cyan	89.0	10.1	47.2	56.2	-23.2	-27.6	-28.5	-27.3
A4	white	95.3	2.1	91.6	93.4	-0.7	-0.3	0.5	1.3
B4	neutral 8	79.5	5.0	77.4	81.8	-1.1	1.1	-0.2	0.8
C4	neutral 6.5	79.6	5.7	64.4	69.5	-0.7	1.7	-0.9	-0.3
D4	neutral 5	88.6	5.0	49.1	53.9	0.2	1.8	-1.2	-0.8
E4	neutral 3.5	100.0	4.0	36.0	40.0	0.3	0.6	-2.0	-1.8
F4	black	96.8	2.5	23.6	26.0	0.8	0.5	-2.7	-1.9
A5	paper white	86.4	2.1	93.8	94.9	-0.4	-0.5	-1.7	0.1
B5	skin highlight L*=89	86.8	3.1	83.3	85.0	12.9	12.8	9.6	6.9
C5	skin highlight L*=75	92.4	3.9	70.7	73.9	17.4	19.4	15.1	14.1
D5	skin shadow L*=25	61.1	8.0	28.2	33.3	12.0	16.8	8.3	12.2
E5	skin shadow L*=11	29.0	10.5	18.4	23.2	10.4	16.9	7.0	13.7
F5	Max Black	91.8	1.8	10.7	11.9	0.7	0.5	-2.7	-1.4

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	85.8	76.0	6.9
Average Score for the Worst 10% (3 lowest scoring patches)	54.7	43.7	13.8
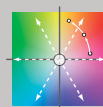
AARDENBURG IMAGING & ARCHIVES

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Original Print Colors
(measured before light exposure)

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Colors after 140 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

140 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	69.5	7.7	36.7	42.5	13.0	17.7	7.8	10.0
B1	light Skin	83.6	6.2	62.5	67.4	14.8	18.6	13.9	13.4
C1	blue sky	75.6	12.3	47.2	57.9	-5.6	-11.1	-22.3	-19.7
D1	foliage	85.8	9.8	42.6	51.7	-11.4	-9.1	17.2	19.8
E1	blue flower	83.1	9.9	50.9	59.4	9.1	4.9	-25.5	-22.7
F1	bluish green	86.8	8.6	66.6	73.9	-30.3	-27.8	-2.5	-6.3
A2	orange	97.0	5.2	59.0	63.7	31.8	33.8	46.2	45.5
B2	purplish blue	70.6	17.3	37.5	48.7	8.0	-3.8	-42.5	-36.5
C2	moderate red	89.2	6.8	46.0	50.1	44.1	48.9	12.1	9.5
D2	purple	91.6	10.1	31.0	40.6	20.2	21.9	-20.0	-17.7
E2	yellow green	90.3	10.6	68.2	76.9	-22.5	-19.7	53.3	47.9
F2	orange yellow	98.4	6.1	67.6	73.5	16.6	17.7	58.5	57.6
A3	blue	74.8	16.7	28.5	40.1	8.8	-2.2	-44.5	-40.0
B3	green	91.8	10.9	51.2	61.3	-37.6	-36.8	24.6	20.5
C3	red	82.9	12.6	37.0	45.5	47.5	53.5	19.7	26.7
D3	yellow	99.2	6.1	75.2	81.2	9.0	8.3	75.7	74.9
E3	magenta	93.1	4.8	49.3	52.2	46.7	50.4	-13.4	-14.3
F3	cyan	88.5	10.8	47.2	57.0	-23.2	-27.7	-28.5	-26.9
A4	white	91.3	2.3	91.6	93.4	-0.7	-0.3	0.5	1.7
B4	neutral 8	75.8	5.7	77.4	82.4	-1.1	1.5	-0.2	0.8
C4	neutral 6.5	72.7	6.7	64.4	70.4	-0.7	2.4	-0.9	-0.5
D4	neutral 5	78.5	6.0	49.1	54.6	0.2	2.8	-1.2	-1.1
E4	neutral 3.5	90.6	4.6	36.0	40.4	0.3	1.7	-2.0	-2.0
F4	black	92.5	2.7	23.6	26.0	0.8	1.6	-2.7	-1.8
A5	paper white	79.2	2.7	93.8	94.8	-0.4	-0.6	-1.7	0.8
B5	skin highlight L*=89	83.4	3.7	83.3	85.2	12.9	12.8	9.6	6.4
C5	skin highlight L*=75	90.9	4.6	70.7	74.5	17.4	19.5	15.1	13.5
D5	skin shadow L*=25	47.7	10.0	28.2	34.0	12.0	17.9	8.3	13.9
E5	skin shadow L*=11	2.7	13.7	18.4	23.7	10.4	18.4	7.0	16.8
F5	Max Black	83.3	2.1	10.7	11.1	0.7	1.1	-2.7	-0.6

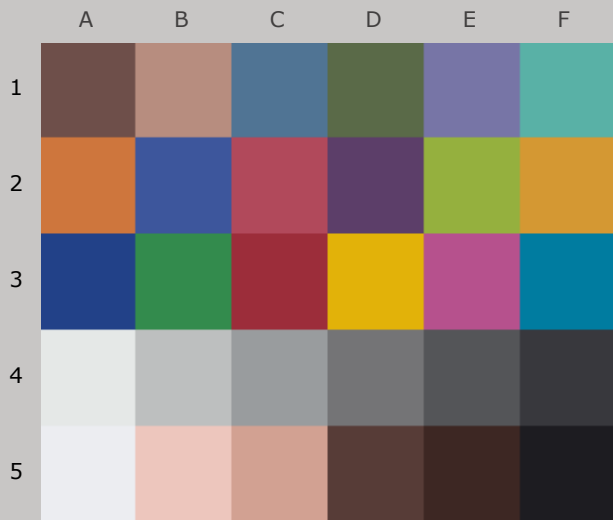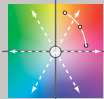| Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	81.4	73.6	7.9
Average Score for the Worst 10% (3 lowest scoring patches)	40.0	39.7	15.9

Aardenburg Imaging
& Archives

Original Print Colors
(measured before light exposure)

Colors after 160 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	69.0	8.8	36.7	43.8	13.0	17.7	7.8	10.0
B1	light Skin	83.9	6.7	62.5	68.1	14.8	18.5	13.9	13.2
C1	blue sky	67.6	14.5	47.2	59.3	-5.6	-12.2	-22.3	-17.9
D1	foliage	87.9	11.1	42.6	53.3	-11.4	-8.8	17.2	18.7
E1	blue flower	73.3	12.4	50.9	60.5	9.1	3.1	-25.5	-20.6
F1	bluish green	87.4	8.9	66.6	74.4	-30.3	-27.5	-2.5	-5.8
A2	orange	94.5	6.6	59.0	64.6	31.8	33.0	46.2	42.9
B2	purplish blue	62.7	20.9	37.5	50.1	8.0	-6.2	-42.5	-33.8
C2	moderate red	88.9	7.4	46.0	50.9	44.1	48.6	12.1	8.8
D2	purple	87.0	12.3	31.0	42.6	20.2	20.6	-20.0	-15.8
E2	yellow green	85.3	13.4	68.2	78.1	-22.5	-20.0	53.3	44.7
F2	orange yellow	95.1	7.9	67.6	74.7	16.6	16.4	58.5	55.1
A3	blue	67.1	20.5	28.5	41.9	8.8	-4.8	-44.5	-37.1
B3	green	87.0	13.1	51.2	62.7	-37.6	-36.6	24.6	18.4
C3	red	84.9	13.0	37.0	47.0	47.5	52.7	19.7	26.1
D3	yellow	94.6	8.7	75.2	82.6	9.0	6.4	75.7	71.9
E3	magenta	94.1	4.8	49.3	52.7	46.7	50.0	-13.4	-12.8
F3	cyan	84.4	12.5	47.2	58.0	-23.2	-28.3	-28.5	-24.9
A4	white	57.9	4.9	91.6	93.4	-0.7	-0.5	0.5	4.9
B4	neutral 8	60.3	7.0	77.4	83.1	-1.1	1.5	-0.2	3.2
C4	neutral 6.5	64.9	7.9	64.4	71.3	-0.7	2.5	-0.9	1.3
D4	neutral 5	73.3	7.3	49.1	55.7	0.2	3.0	-1.2	0.1
E4	neutral 3.5	86.5	5.9	36.0	41.6	0.3	1.9	-2.0	-1.1
F4	black	89.9	4.1	23.6	27.5	0.8	1.5	-2.7	-1.4
A5	paper white	39.7	6.3	93.8	94.7	-0.4	-0.9	-1.7	4.5
B5	skin highlight L*=89	92.1	2.7	83.3	85.3	12.9	12.8	9.6	7.8
C5	skin highlight L*=75	92.3	4.9	70.7	75.0	17.4	19.3	15.1	13.9
D5	skin shadow L*=25	49.8	11.0	28.2	35.8	12.0	17.7	8.3	13.7
E5	skin shadow L*=11	11.1	13.8	18.4	25.9	10.4	18.0	7.0	15.7
F5	Max Black	87.7	2.9	10.7	13.0	0.7	0.5	-2.7	-1.0

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	76.7	70.1	9.4
Average Score for the Worst 10% (3 lowest scoring patches)	33.5	34.1	18.6
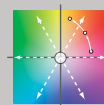
AARDENBURG IMAGING
& ARCHIVES

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Original Print Colors
(measured before light exposure)

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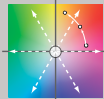
Colors after 180 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

180 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	70.0	9.5	36.7	44.8	13.0	17.9	7.8	9.1
B1	light Skin	79.1	7.9	62.5	68.8	14.8	18.5	13.9	10.9
C1	blue sky	71.9	14.8	47.2	60.3	-5.6	-11.9	-22.3	-19.3
D1	foliage	88.4	12.2	42.6	54.4	-11.4	-8.5	17.2	17.1
E1	blue flower	76.3	12.6	50.9	61.5	9.1	3.1	-25.5	-22.1
F1	bluish green	78.3	11.2	66.6	75.2	-30.3	-26.6	-2.5	-8.6
A2	orange	90.0	8.8	59.0	65.3	31.8	32.1	46.2	40.2
B2	purplish blue	63.6	21.5	37.5	51.5	8.0	-6.3	-42.5	-34.6
C2	moderate red	85.2	9.0	46.0	51.4	44.1	48.7	12.1	6.5
D2	purple	90.3	13.2	31.0	43.8	20.2	20.7	-20.0	-16.7
E2	yellow green	78.9	16.6	68.2	79.0	-22.5	-20.2	53.3	40.8
F2	orange yellow	89.8	10.5	67.6	75.7	16.6	15.1	58.5	52.0
A3	blue	66.6	21.6	28.5	43.4	8.8	-5.3	-44.5	-37.7
B3	green	80.4	15.5	51.2	63.6	-37.6	-36.3	24.6	15.4
C3	red	88.2	12.7	37.0	47.9	47.5	52.3	19.7	24.1
D3	yellow	89.3	12.0	75.2	83.5	9.0	4.9	75.7	68.1
E3	magenta	93.2	5.4	49.3	53.1	46.7	50.3	-13.4	-14.5
F3	cyan	88.1	12.6	47.2	58.8	-23.2	-27.7	-28.5	-26.5
A4	white	91.0	2.6	91.6	93.8	-0.7	-0.3	0.5	1.7
B4	neutral 8	73.8	7.0	77.4	83.8	-1.1	1.8	-0.2	0.5
C4	neutral 6.5	66.4	8.5	64.4	72.1	-0.7	3.0	-0.9	-0.9
D4	neutral 5	68.9	8.2	49.1	56.5	0.2	3.7	-1.2	-1.5
E4	neutral 3.5	80.2	6.8	36.0	42.3	0.3	2.7	-2.0	-2.3
F4	black	89.3	4.8	23.6	28.1	0.8	2.2	-2.7	-2.1
A5	paper white	74.3	3.2	93.8	95.0	-0.4	-0.7	-1.7	1.2
B5	skin highlight L*=89	69.8	5.9	83.3	85.7	12.9	12.9	9.6	4.2
C5	skin highlight L*=75	81.6	6.8	70.7	75.6	17.4	19.3	15.1	10.7
D5	skin shadow L*=25	51.4	11.6	28.2	37.0	12.0	17.9	8.3	13.1
E5	skin shadow L*=11	4.0	15.2	18.4	27.0	10.4	18.5	7.0	16.5
F5	Max Black	86.9	3.1	10.7	13.3	0.7	0.7	-2.7	-0.9

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	76.8	67.7	10.4
Average Score for the Worst 10% (3 lowest scoring patches)	39.6	29.7	19.9

Aardenburg Imaging
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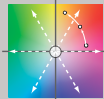|	A	B	C	D	E	F		A	B	C	D	E	F
1							1						
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Original Print Colors
(measured before light exposure)

Colors after 200 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

200 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)

Column/row	Color Patch	I*Color	ΔE	L* Before	L* After	a* Before	a* After	b* Before	b* After
A1	dark Skin	66.0	10.6	36.7	45.7	13.0	18.3	7.8	9.7
B1	light Skin	77.8	8.6	62.5	69.5	14.8	18.5	13.9	10.5
C1	blue sky	70.7	15.8	47.2	61.3	-5.6	-12.0	-22.3	-19.0
D1	foliage	85.9	13.2	42.6	55.4	-11.4	-8.0	17.2	17.2
E1	blue flower	73.1	13.9	50.9	62.5	9.1	2.4	-25.5	-21.5
F1	bluish green	75.3	12.2	66.6	75.8	-30.3	-25.8	-2.5	-9.1
A2	orange	90.5	9.1	59.0	66.0	31.8	31.3	46.2	40.4
B2	purplish blue	60.5	23.2	37.5	52.6	8.0	-7.3	-42.5	-33.8
C2	moderate red	84.9	9.4	46.0	51.9	44.1	48.8	12.1	6.4
D2	purple	89.1	14.6	31.0	45.2	20.2	20.4	-20.0	-16.4
E2	yellow green	75.4	18.7	68.2	79.6	-22.5	-19.5	53.3	38.8
F2	orange yellow	89.1	11.4	67.6	76.5	16.6	14.3	58.5	51.8
A3	blue	63.2	23.8	28.5	44.9	8.8	-6.6	-44.5	-36.8
B3	green	77.5	16.9	51.2	64.3	-37.6	-35.7	24.6	14.2
C3	red	87.7	13.6	37.0	48.7	47.5	51.9	19.7	24.9
D3	yellow	87.4	13.6	75.2	84.2	9.0	3.9	75.7	66.9
E3	magenta	92.7	5.8	49.3	53.5	46.7	50.6	-13.4	-14.2
F3	cyan	88.0	13.3	47.2	59.6	-23.2	-27.6	-28.5	-26.3
A4	white	89.8	2.6	91.6	93.7	-0.7	-0.2	0.5	1.8
B4	neutral 8	72.0	7.5	77.4	84.3	-1.1	2.0	-0.2	0.3
C4	neutral 6.5	61.4	9.4	64.4	72.8	-0.7	3.5	-0.9	-1.2
D4	neutral 5	61.4	9.2	49.1	57.3	0.2	4.4	-1.2	-1.7
E4	neutral 3.5	71.5	7.5	36.0	42.8	0.3	3.5	-2.0	-2.4
F4	black	81.4	5.2	23.6	28.3	0.8	2.9	-2.7	-1.8
A5	paper white	70.8	3.4	93.8	94.8	-0.4	-0.7	-1.7	1.6
B5	skin highlight L*=89	65.4	6.6	83.3	85.9	12.9	12.9	9.6	3.5
C5	skin highlight L*=75	78.0	7.8	70.7	76.2	17.4	19.1	15.1	9.8
D5	skin shadow L*=25	42.0	13.3	28.2	37.9	12.0	18.3	8.3	14.7
E5	skin shadow L*=11	-20.2	18.1	18.4	27.8	10.4	19.3	7.0	19.7
F5	Max Black	81.0	3.0	10.7	12.6	0.7	1.1	-2.7	-0.4

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	73.0	65.4	11.4
Average Score for the Worst 10% (3 lowest scoring patches)	27.4	26.3	21.9

AARDENBURG IMAGING
& ARCHIVES

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$71.2_{color}/62.9_{tone}$

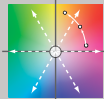|	A	B	C	D	E	F
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Original Print Colors
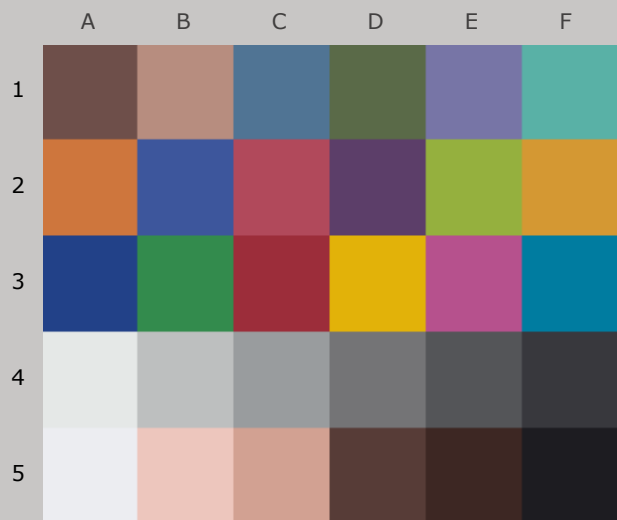(measured before light exposure)

Colors after 220 Megalux-hours
light exposure

HP8750, HP OEM Ink (tricolor, blue, gray),
HP Premium Plus Photo Satin

220 Mlux-hrs Light Exposure (i.e., after) Compared to Original Print Colors (i.e., before)									
				L*		a*		b*	
Column/row	Color Patch	I*Color	ΔE	Before	After	Before	After	Before	After
A1	dark Skin	68.9	11.4	36.7	46.9	13.0	18.2	7.8	8.3
B1	light Skin	71.3	9.9	62.5	70.1	14.8	18.3	13.9	8.6
C1	blue sky	70.8	16.7	47.2	62.3	-5.6	-12.1	-22.3	-19.2
D1	foliage	81.2	14.7	42.6	56.6	-11.4	-7.6	17.2	14.9
E1	blue flower	71.4	15.0	50.9	63.4	9.1	1.8	-25.5	-21.7
F1	bluish green	71.0	13.5	66.6	76.3	-30.3	-25.2	-2.5	-10.3
A2	orange	82.8	12.8	59.0	66.7	31.8	30.5	46.2	36.2
B2	purplish blue	58.7	24.5	37.5	53.7	8.0	-7.9	-42.5	-33.3
C2	moderate red	80.8	11.3	46.0	52.4	44.1	48.6	12.1	4.0
D2	purple	88.5	16.1	31.0	46.6	20.2	19.8	-20.0	-16.2
E2	yellow green	68.1	22.7	68.2	80.6	-22.5	-19.8	53.3	34.5
F2	orange yellow	81.6	15.3	67.6	77.5	16.6	13.0	58.5	47.4
A3	blue	60.5	25.5	28.5	46.1	8.8	-7.5	-44.5	-36.0
B3	green	70.0	19.9	51.2	65.3	-37.6	-35.2	24.6	10.9
C3	red	92.4	13.5	37.0	49.7	47.5	51.3	19.7	21.9
D3	yellow	80.7	18.3	75.2	85.3	9.0	2.3	75.7	62.0
E3	magenta	92.8	6.1	49.3	53.9	46.7	50.4	-13.4	-14.8
F3	cyan	88.8	14.0	47.2	60.4	-23.2	-27.3	-28.5	-26.4
A4	white	94.3	2.6	91.6	93.9	-0.7	-0.1	0.5	1.3
B4	neutral 8	71.5	8.1	77.4	84.9	-1.1	2.1	-0.2	-0.3
C4	neutral 6.5	58.4	10.3	64.4	73.7	-0.7	3.7	-0.9	-1.6
D4	neutral 5	57.1	10.2	49.1	58.2	0.2	4.7	-1.2	-2.2
E4	neutral 3.5	66.9	8.7	36.0	43.9	0.3	3.9	-2.0	-2.8
F4	black	80.0	6.4	23.6	29.5	0.8	3.2	-2.7	-2.3
A5	paper white	75.3	3.1	93.8	95.1	-0.4	-0.6	-1.7	1.1
B5	skin highlight L*=89	56.2	8.1	83.3	86.2	12.9	13.0	9.6	2.0
C5	skin highlight L*=75	70.1	9.6	70.7	76.8	17.4	19.0	15.1	7.9
D5	skin shadow L*=25	49.2	13.9	28.2	39.5	12.0	18.3	8.3	13.2
E5	skin shadow L*=11	-9.2	18.0	18.4	29.6	10.4	19.1	7.0	18.1
F5	Max Black	86.3	3.5	10.7	13.7	0.7	1.0	-2.7	-0.9

Summary Results	I*Color	I*tone	ΔE
Average Score for all patches	71.2	62.9	12.8
Average Score for the Worst 10% (3 lowest scoring patches)	32.0	22.2	24.2

Aardenburg Imaging & Archives

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	A	B	C	D	E	F
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Original Print Colors
(measured before light exposure)

Test Complete

No further updates

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