

Matching GRACol on HP 6600 at MPI CA

When Aaron did a demo of the Esko front end software in our CA plant, the item that intrigued me the most was what appeared to be Device link software in the color strategy, a Source Profile and a Destination Profile.

In the press runs I do on our Flexo presses under ISO 12647-2, my process is to start with an ink that closely matches the specs, run a P2P target and adjust density until the Labch values are as close as possible to 12647-2 specs. I then use the P2P data to create a gray balance curve. I will then repeat this process for anything that changes in the print chain, such as stock type, finishing (varnish vs laminate).

My impression of device link software, is that if the destination space is larger than the source space it will adjust color to cover the source space without one having to change densities. My impression after attempts to do this using the Esko software, is that while it gets close, it still misses the mark.

My observation shows that while the images printed match a GRACol proof closely, the raw numbers do not.

The following pages outline the results of some of what I have done to match GRACol.

I look forward to any comments, suggestions that those at HP and Esko have after viewing this document.

These were my goals:

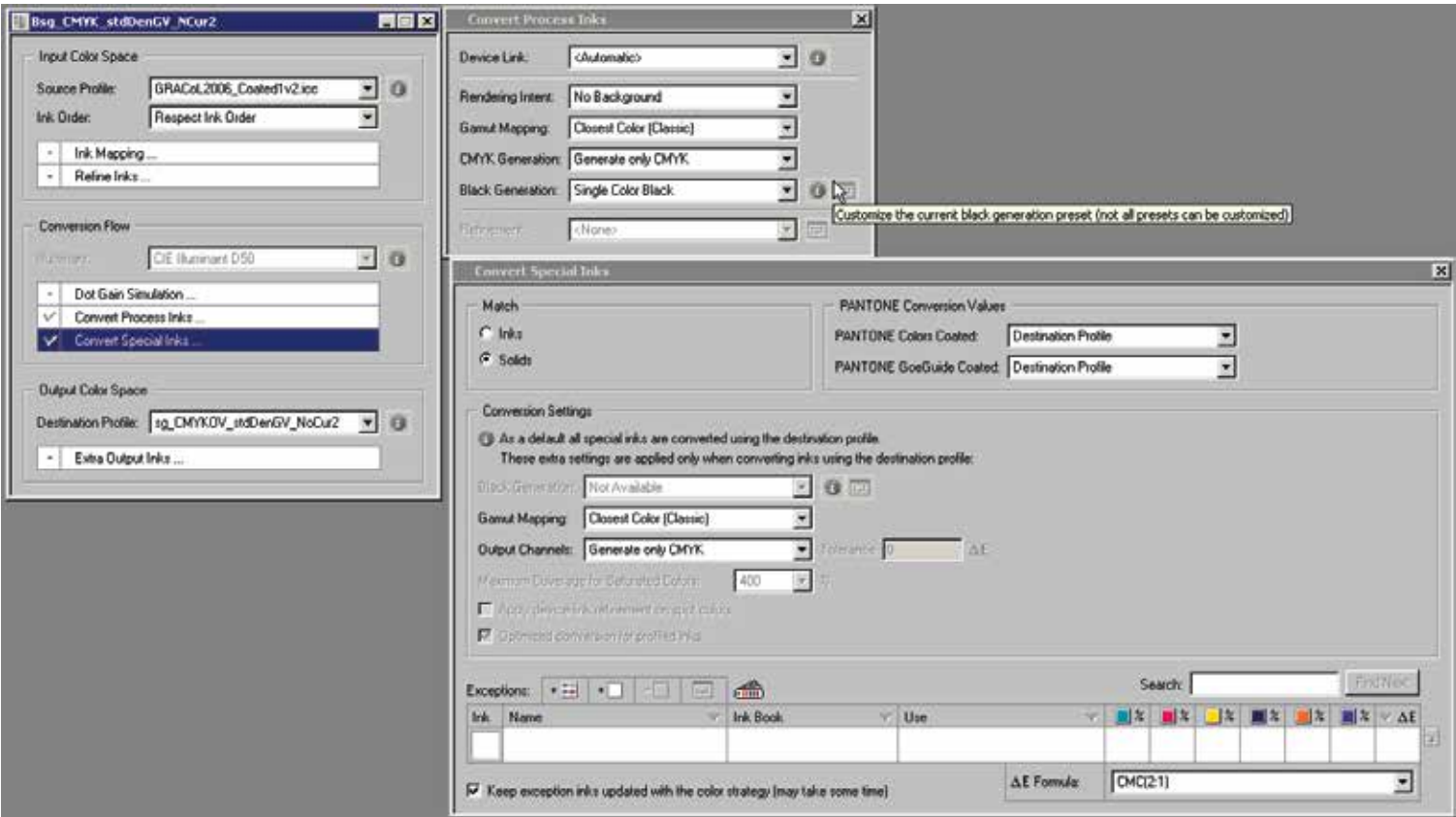
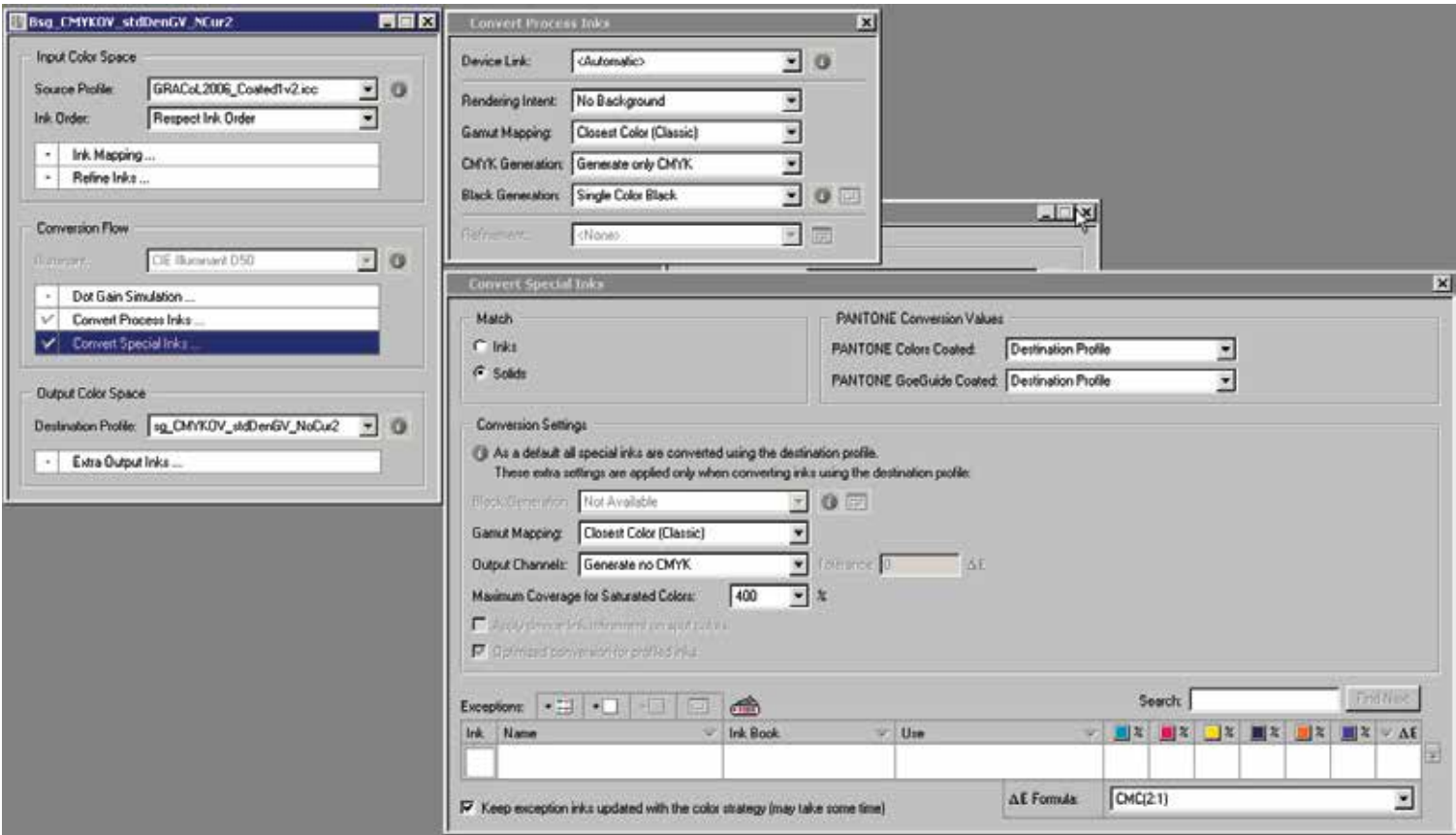
1. **SUCCEEDED** - Match CMYK images between a strategy that converted PMS colors to only CMYK , and a strategy that converted CMYK to CMYK only and allowed PMS colors to take advantage of 7 colors. My concern in using only a straight CMYK profile for the CMYK strategy and a 7 Color profile for the 7 color strategy was, that because of two separate press runs and scanning sessions the CMYK would not be the best match. I feel that I have achieved this goal with the strategies and results shown on pages 2 - 4.
2. **PARTIALLY SUCCEEDED** - Match ISO 12647-2 numbers without having to change densities for different print chains. I feel that visually I have met this goal. However if I had to justify meeting it via raw numbers and gray balance, I could not. Results of my testing are on pages 5 - 6. Page 5 list the specifications I was trying to meet and a comparison between a GRACol profile and my 7 color HP profile. GRACol is in red and 7 Color is in true color. Note that there are some areas the the 7 color profile falls short of covering the GRACol profile. Page 6 shows the gray balance not as tight as possible, and, how far out the Labch numbers are to ISO 12647-2.
3. **STILL STRUGGLING** - Exploit 7 colors where needed to print an enhanced, over just CMYK, image; AND, have CMYK 100% patches match ISO 12647-2. This one has me somewhat baffled, as there seems to be no way to bring in an RGB image and convert as I describe in the proceeding sentence. As a comparison to see how extra colors above CMYK would affect an image, I compared an RGB file that I had converted in Photoshop to GRACol and the same image I converted in Photoshop using a 7 color profile I made in Profilemaker from the measurement file of the HP 7 color target run. The straight CMYK file looked closer to the RGB file than did the 7 color file. Photos of these prints are on page 7. I tried on 7 color using magenta1 and one not using magenta 1. Speaking of magenta 1, when I used it all magenta was found only in the magenta1 separation, and when I did not use it all magenta was found only in the magenta separation. So I not sure exactly what magenta1 is all about other than changing screen angle. I do know that if one leaves it out of the profile run, there are big holes in the profile. Pages 8 -10 show the separations of these 3 files as seen in Smart Stream Viewer.

Both these strategies use the same CMYKOV profile.

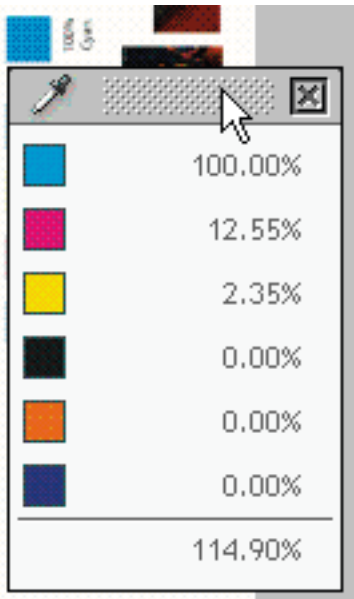
The CMYKOV strategy is set up for CMYK Conversions to be only CMYK, but in Convert Special Colors Window Generate no CMYK was selected to allow those colors we decide would be a better match by using more than CMYK.

The CMYK strategy is set up for CMYK Conversions to be only CMYK and, Convert Special Colors Window has Output Channels to be only CMYK and will be used for PMS colors that would not benefit from additional colors.

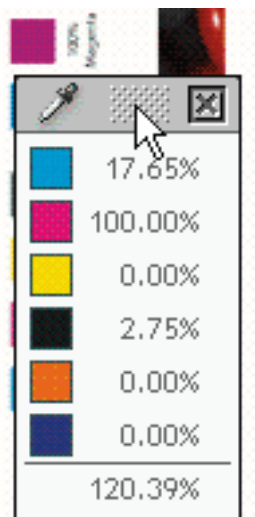
Some conversions for each strategy are on pages 3 and 4 .



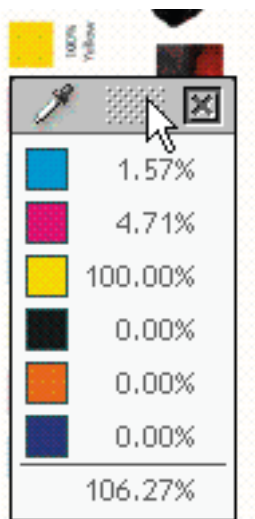
Converted through CMYKOV



100% Cyan

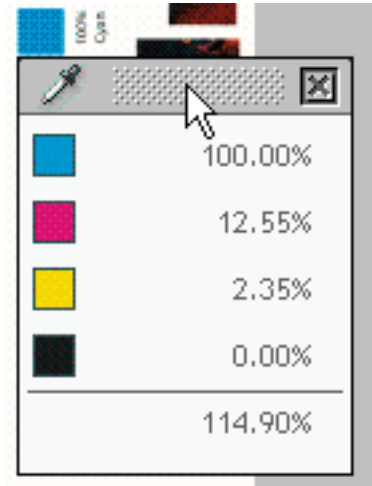


100% Magenta

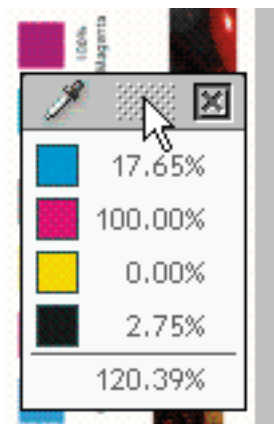


100% Yellow

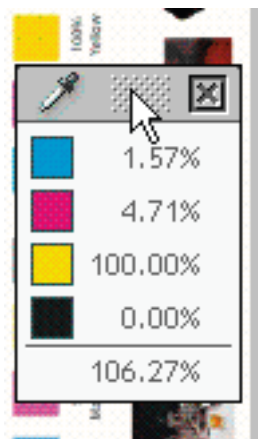
Converted through CMYK



100% Cyan

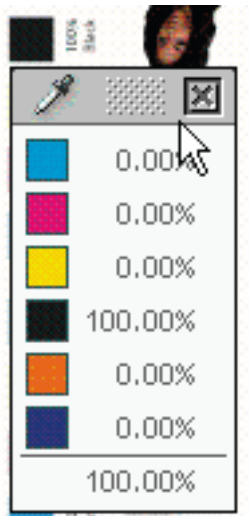


100% Magenta

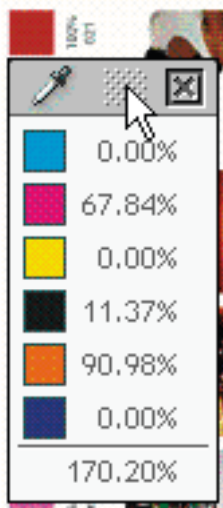


100% Yellow

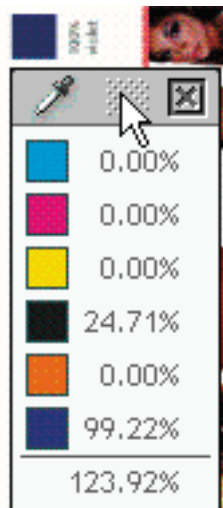
Converted through CMYKOV



100% Black

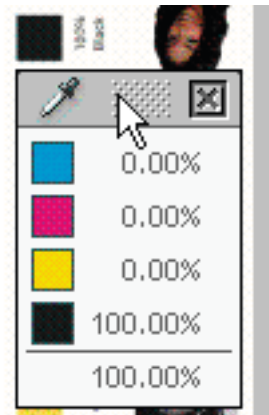


100% PMS 021

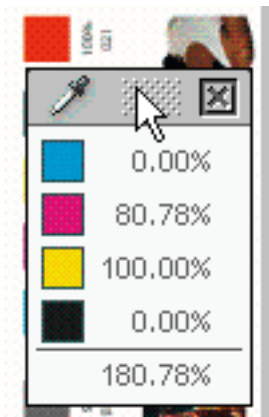


100% PMS Violet

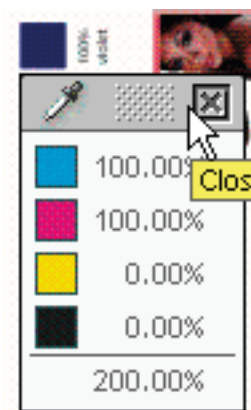
Converted through CMYK



100% Black



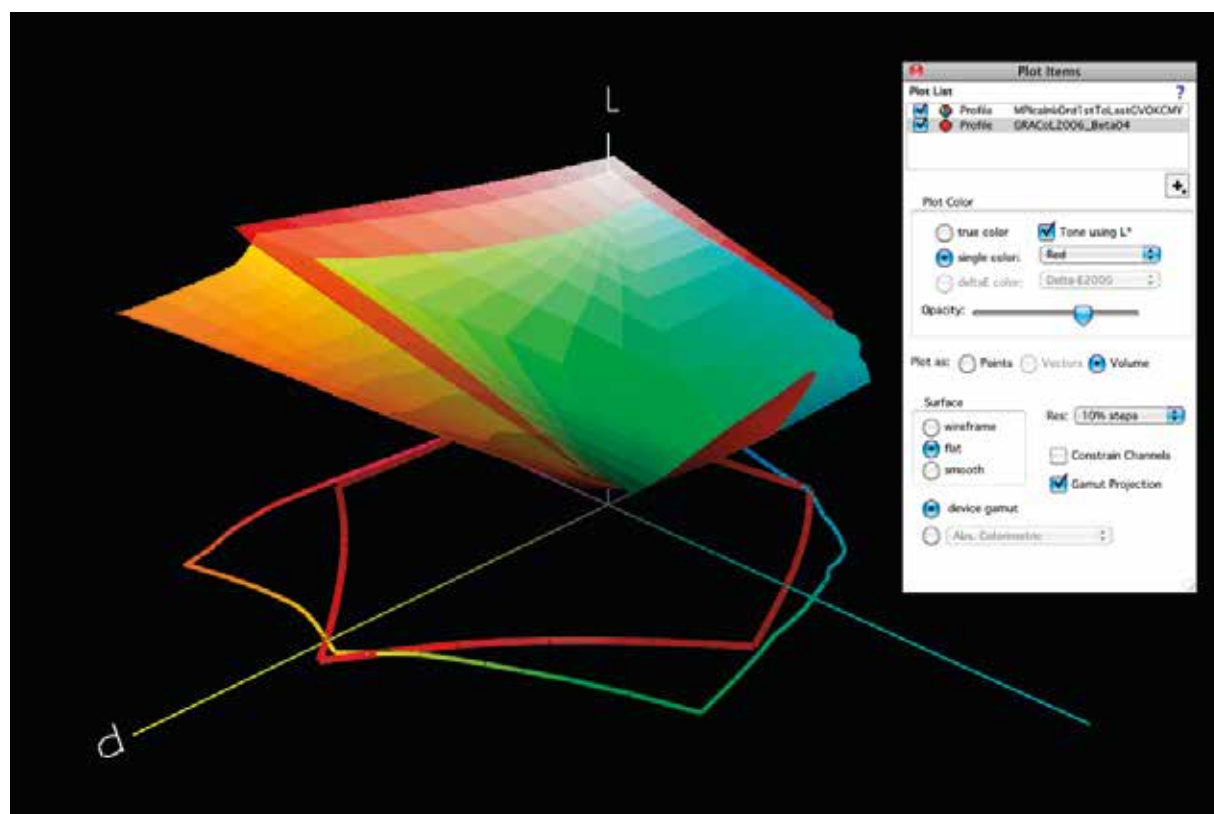
100% PMS 021



100% PMS Violet

		L	a	b	c	h
Numbers to Match						
C		55	-37	-50	62	233
M		48	74	-3	74	358
Y		89	-5	93	93	93
K		16	0	0	n/a	n/a
R		46.9	68.06	47.58	83.04	34.96
G		49.76	-68.07	25.4	72.65	159.54
B		23.95	17.18	-46.11	49.2	290.43
Ink tolerances: L value ≤ 3 , a* and b* ≤ 2 , Hue angle and chroma ≤ 2						

Table of "G7" Values and Tolerances I am trying to meet



7 Color Profile Made In Profilemaker Using Data from HP 7 Color Targets

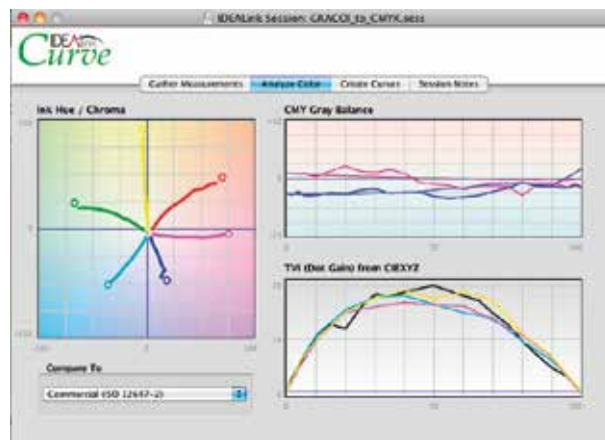
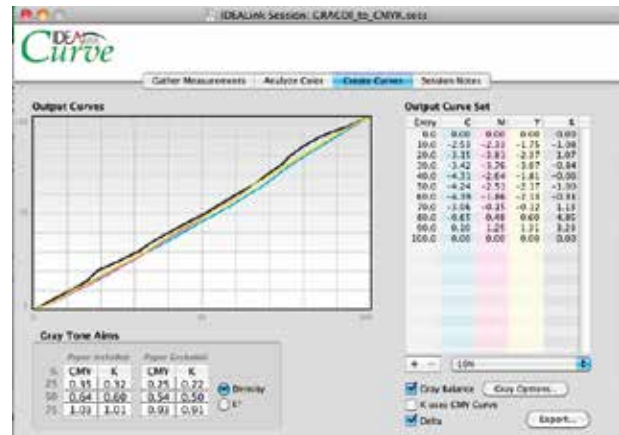
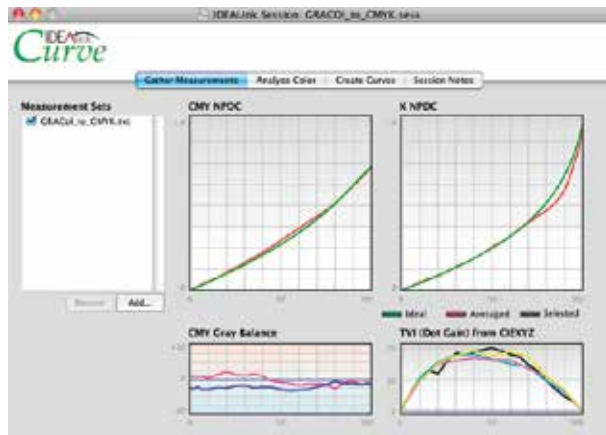
vs

GRACOL 2006 Profile

NOTE: there are areas of GRACol profile that are not covered by HP 7 color profile

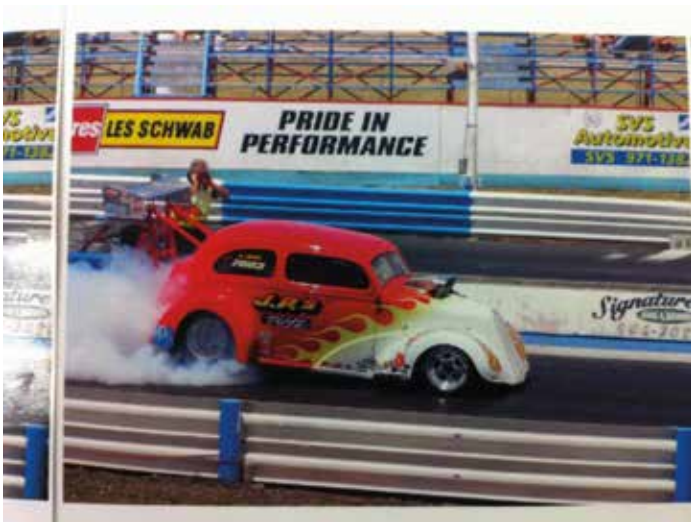
Color Strategy is GRACol to CMYK

pass fail chart is a comparison to numbers in table on page 5

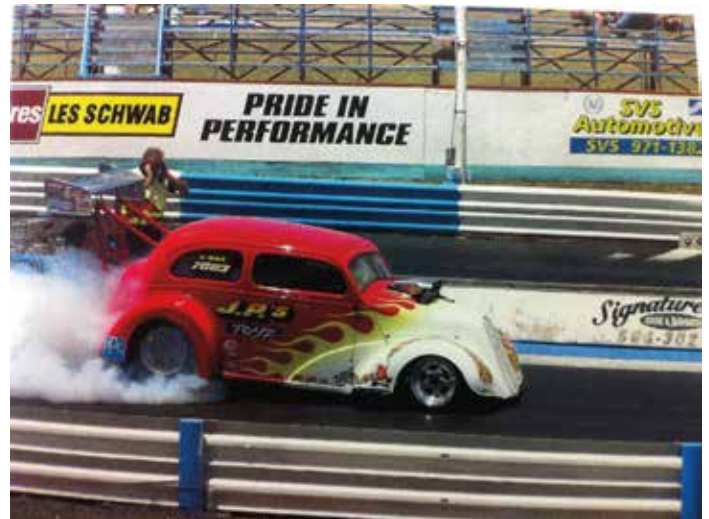


Data from P2P target on GRACol to CMYK Color Strategy

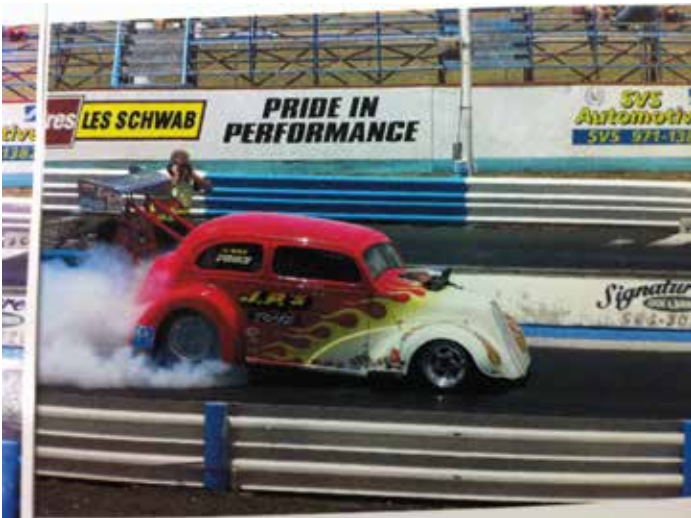
RED=FAIL	GREEN=PASS	L	a	b	c	h	dE - Lab
GRACol to CMYK							
C		52.63	-34.63	-48.4	59.51	234.41	3.71
M		46.27	69.91	-3.76	70.01	356.92	4.5
Y		86.09	-4.27	85.26	85.37	92.87	8.3
K		9.98	0.02	1.81	n/a	n/a	6.28
R		46.11	63.18	43.04	76.45	34.26	6.71
G		47.07	-63.6	20.13	66.71	162.44	7.41
B		24.72	12.1	-43.28	44.94	285.62	5.86



CMYK Only - RGB converted to GRACol in Photoshop.
 Strategy had GRACol as source and HP 7 color as destination, BUT, only CMYK was selected.
 Separations on Page 8



7 color - RGB converted in Photoshop to 7 color,
 Strategy had GRACol as source and HP 7 color as destination. No CMYK was selected. Printed
 with Magenta 1.
 Separations on Page 9



7 color - RGB converted in Photoshop to 7 color,
 Strategy had GRACol as source and HP 7 color as destination. No CMYK was selected.
 Printed without Magenta 1.
 Separations on Page 10

NOTE: ignore file names on these separations. They were separated as indicated on page 7





