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Order from:	LaserSoft Imaging AG Mr. Rossee Luisenweg 6-8 24105 Kiel
Order of:	17.06.2009 Mr. Rossee
Report prepared by:	Dipl.-Ing. Andreas Kraushaar Dipl.-Ing. Claas Bickeböller
Task:	Colour accuracy assessment of the SilverFast software with the scanner Epson V750
Submitted material:	1x IT8.7/1 chart 1x IT8.7/2 chart 1x DVD SilverFast software package

Documents enclosed:

1.   Task:

The colorimetrical accuracy of the scanned test charts (a IT8.7/1 transmission target and a IT8.7/2 reflective target [3]), using an Epson V750 scanner, should be evaluated.

2.   Bibliography:

[1]   Kraushaar, A.:
Quality assessment of colour management profiles
Munich, Fogra, Research project Nr. 10.045, 2006

[2]   ISO 13655:1996
Graphic technology -- Spectral measurement and colorimetric computation for graphic arts images
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

[3]   Norm ISO 12641:1997
Graphic technology -- Prepress digital data exchange -- Colour targets for input scanner calibration
How to get: Beuth-Verlag, 10772 Berlin [www.beuth.de]

3.   Software Setup

The software "SilverFast" (version 6.6.1r1a) has been installed on a MS Windows XP operating system. The scanner, Epson Perfection V750 Pro, was connected to the computer via USB.

Before the scans have been made the lamp was warmed up by scanning 10 arbitrary images. Both the reflective and the transmissive (positive polarity) scans have been made after an automatic "IT8-calibration". Though two ICC-scanner profiles have been created. The scanning resolution was 300 dpi (dots/pixels per inch), the mode was RGB, 16 bit per channel, and the pertinent ICC-profile was tagged to the scanned images. All automatic transformation have been switched off. The detailed scanning and colour management settings are depicted in the figures 1 to 3.
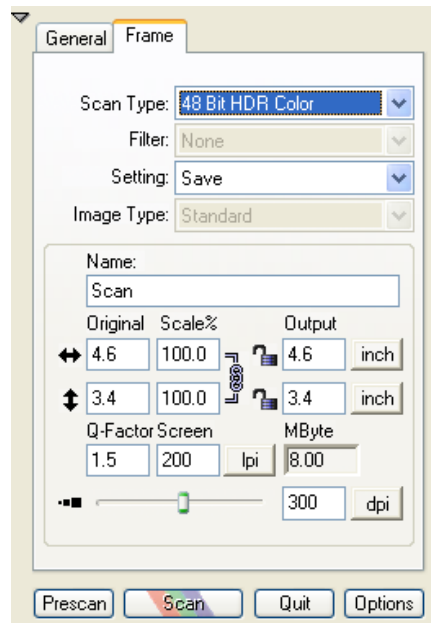
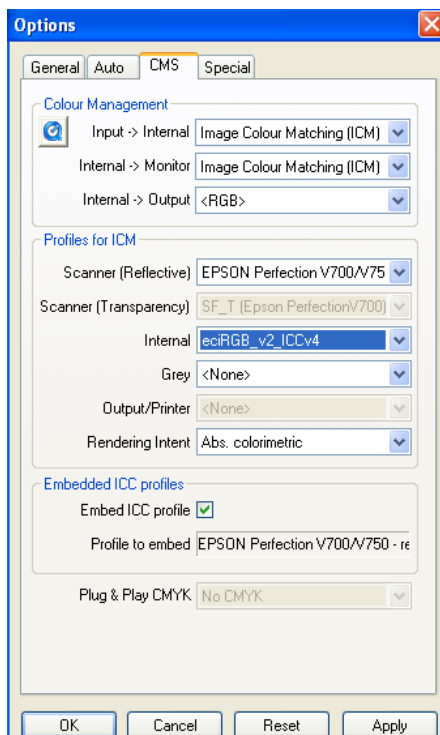**Fig. 1: Basic settings for both the reflective and transmissive mode.**

Fig. 2: Colour management settings for the reflective sample.
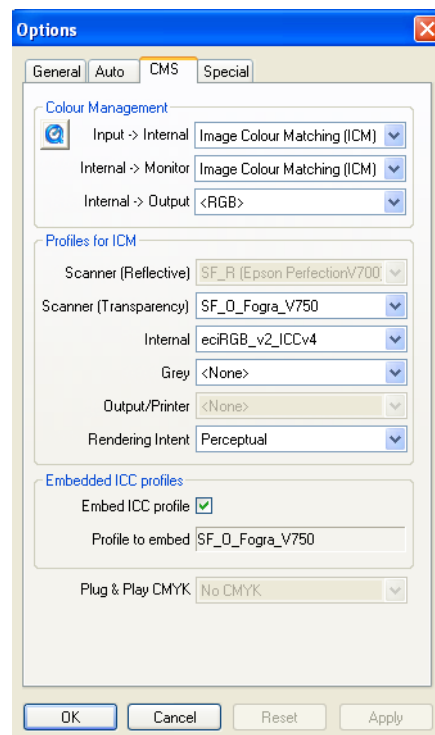

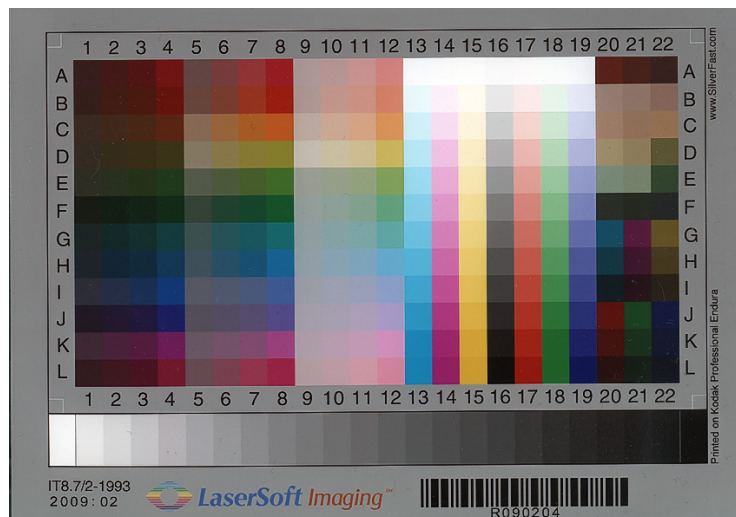**Fig. 3: Colour management settings for the transmissive sample.**

Fig. 4: Scan of the reflection target (15 x 10 cm) – „R090204".

4. Data preparation

The scanned RGB images have been converted to CIELAB, 8 bit per channel, using Adobe Photoshop CS3. The rendering intent was "absolute coloirmetric" and the used CMM was the "Adobe (ACE)". The resulting 8bit CIELAB images have been used to identify the mean CIELAB-values for all patches. For each colour patch a sample area of 10 x10 pixels (100 pixels) has been used.

5. Colorimetrical evaluation

The reference CIELAB values [2] for both targets haven been downloaded from http://www.silverfast.com/it8calibration/. A barcode printed on the targets provides an unambiguous assignment namely the ID "R090204" for the reflection target and ID „T080209" for the transmission sample.

The resulting CIELAB-values have been then statistically analyzed against the corresponding reference. The results are tabled in Table 1 and visualized in figures 5 and 6.

Colour difference	Reflective scan	Transmissive scan
ΔE^*_{ab} (mean)	1,2	1,7
ΔE^*_{ab} (max)	9,8	9,7
ΔE^*_{ab} (std)	1,4	1,4
ΔH (mean)	0,5	0,8
ΔH (max)	5,8	4,3
ΔH (std)	0,8	0,8
ΔE^*_{00} (mean)	0,8	1,0
ΔE^*_{00} (max)	8,1	4,3
ΔE^*_{00} (std)	0,9	0,7
95% quantile (ΔE^*_{ab})	3,3	4,4

Table 1: Statistical evaluation of the colorimetrical accuracy of the scanned images.
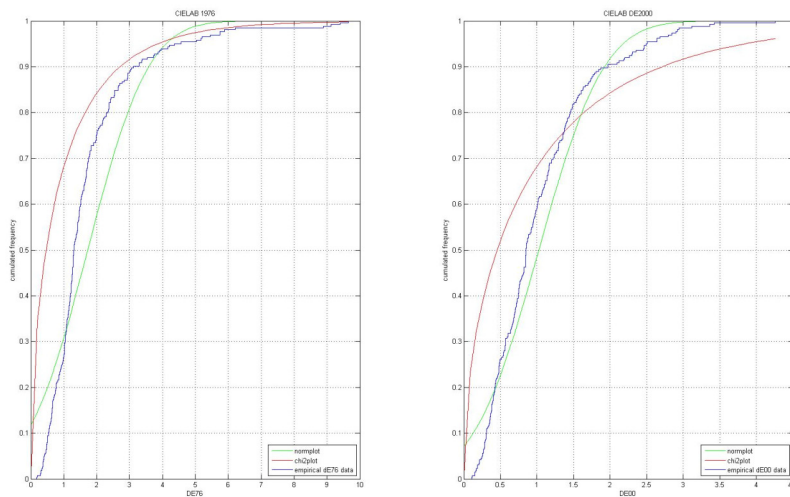

Fig. 5: Cumulative frequency plot of the CIE1976 and CIEDE2000 colour differences – transparency scan.
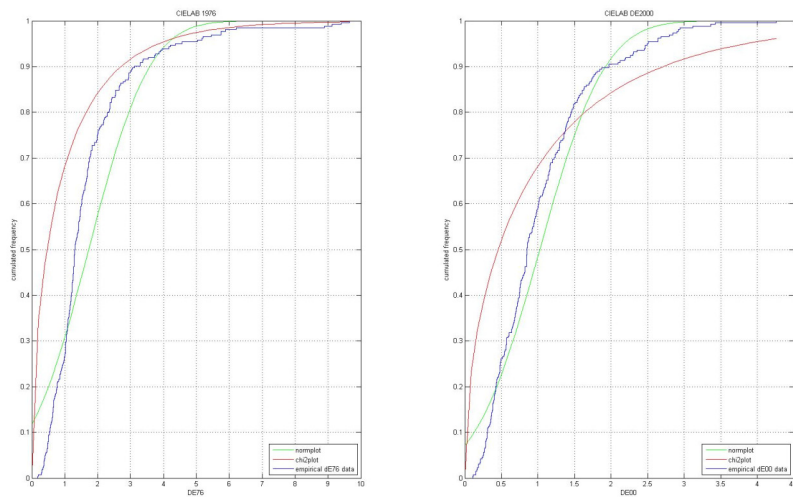
Fig. 6: Cumulative frequency plot of the CIE1976 and CIEDE2000 colour differences – reflective scan.

6.   Conclusion

In the light of an extensive field test of scanner profiling tools conducted by Fogra [1] the evaluation of the colorimetrical accuracy of the SilverFast software solution shows a very good quality for both the transmissive and reflective IT8-testchart. Especially the automatic colour calibration ("IT8-calibration") seemed to be very useful in the field.

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