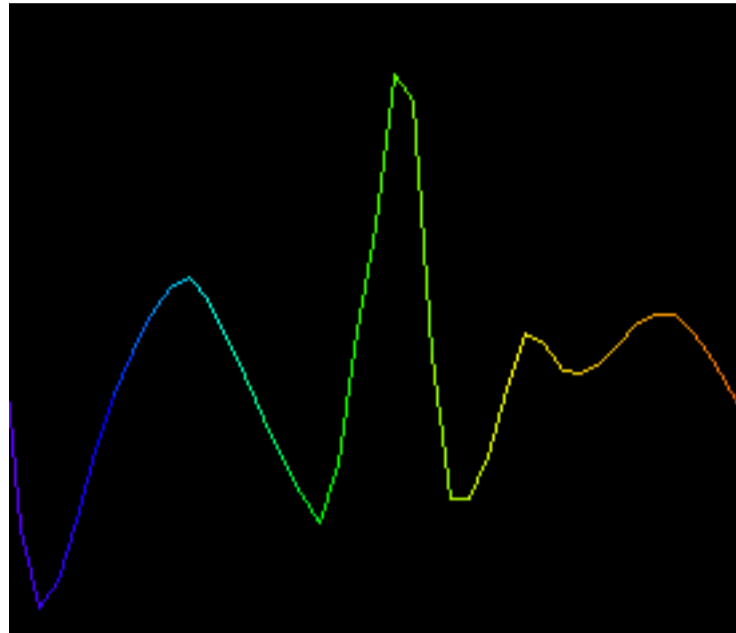


Gernot Hoffmann

Spectra for Proofing Light



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1. Introduction

CMYK Gray wedges, printed by a fully calibrated inkjet, have balanced grays for arbitrary room light but green tints for simulated D50 light.

Several diagrams show the spectra of light for viewing booths, spectra for standard illuminants and reflectance spectra for CMY inks.

The green spike in the spectra for fluorescent lamps seems to be responsible for the viewing light metamerism. But SoLux bulbs, which have smooth spectra, cause just the same effect, at least for higher luminances.

Several diagrams and measuring results which might be useful in the context were added.

Settings for Acrobat

Edit / Preferences / General / Page Display (since version 6)

Custom Resolution 72 dpi

Edit / Preferences / General / Color Management (full version only)

sRGB

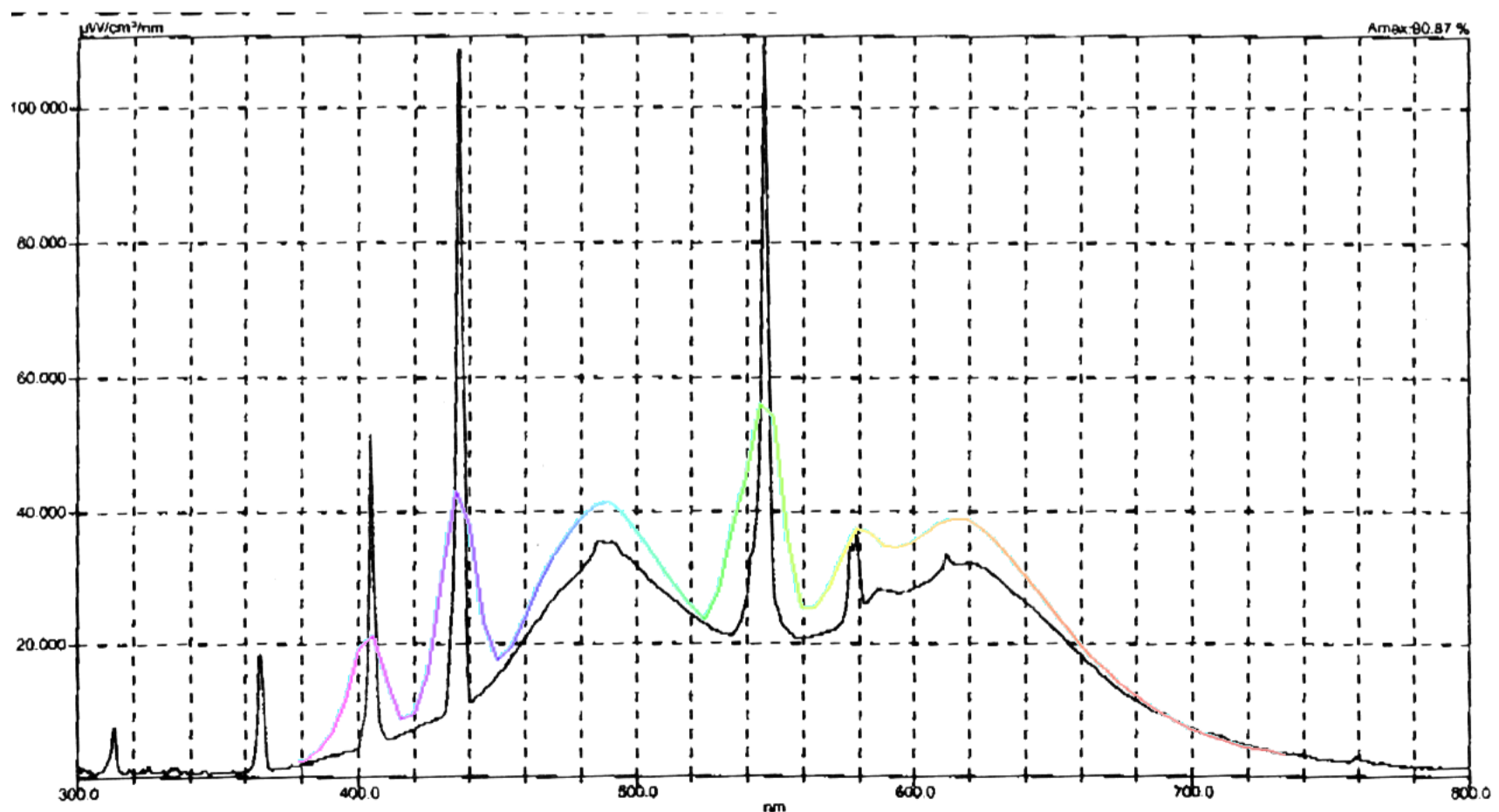
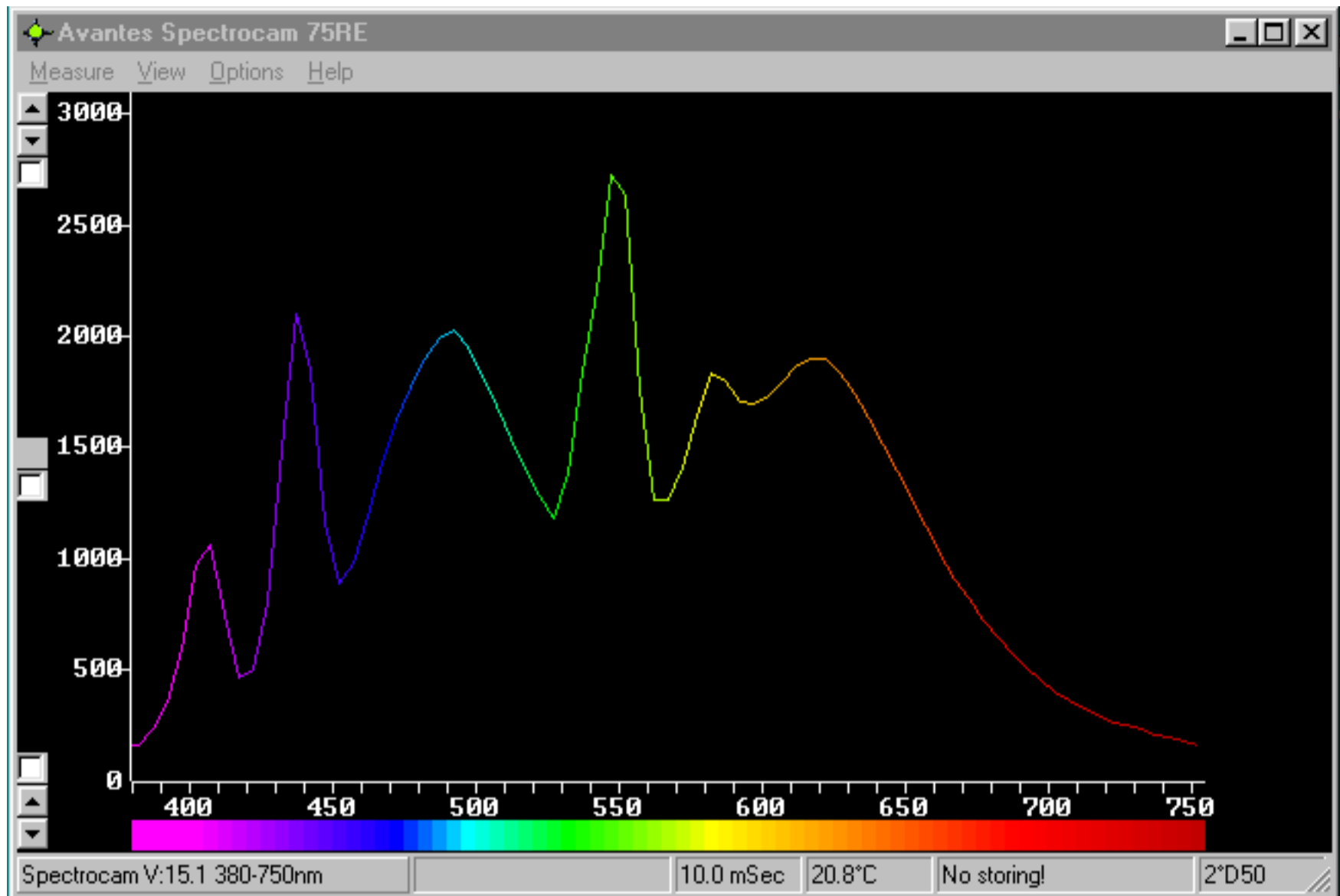
EuroscaleCoated or ISOCoated or SWOP

GrayGamma 2.2

2. Spectrum of Just Normlicht ProofTop Multi5000

Measured by Spectrocam using a paper reflector. 5052K / 1723 lux

Best view 72dpi / zoom 100%

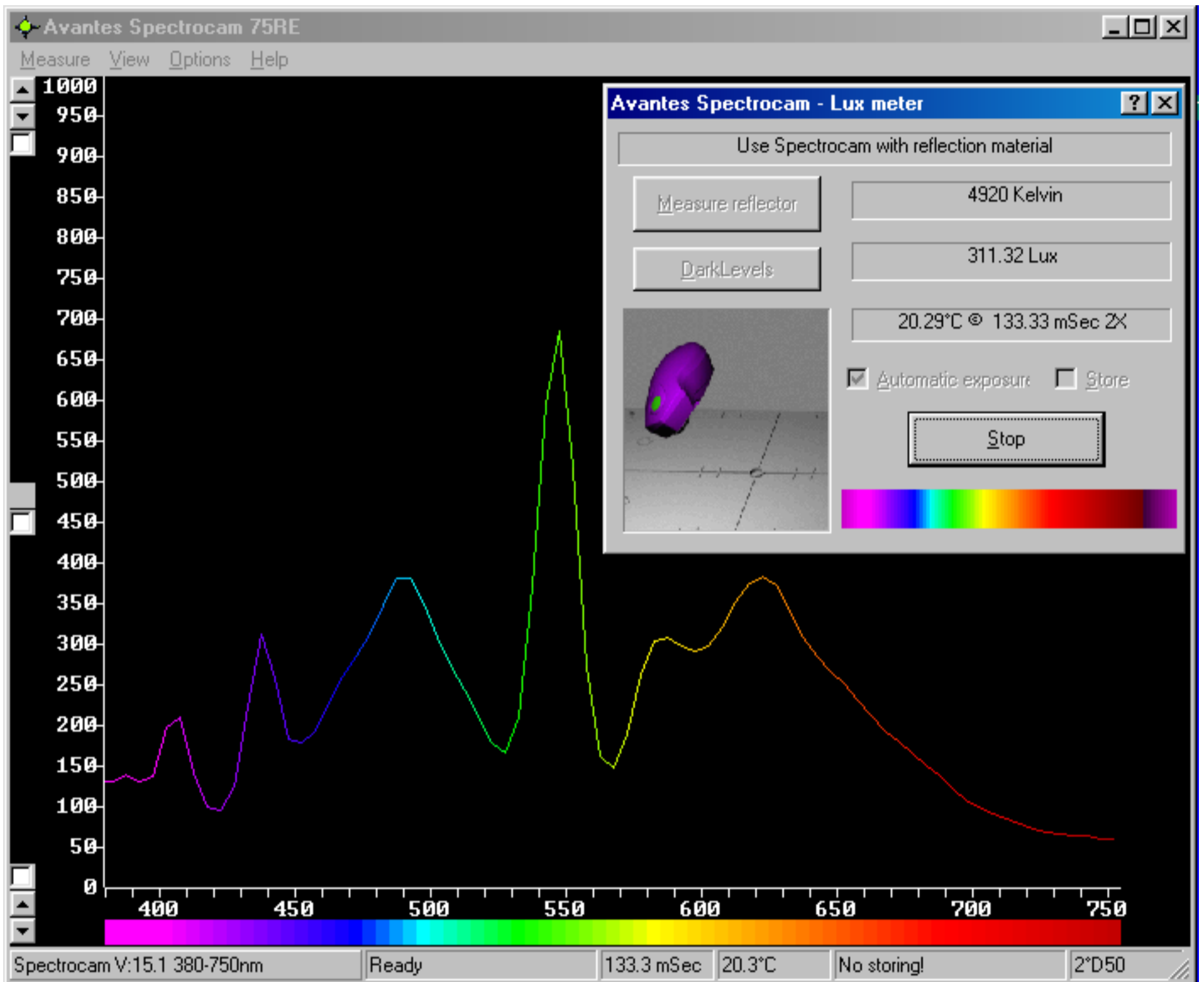


Black diagram by courtesy of Just Normlicht. Color curve copied from the upper diagram by manual curve fitting.

3. Spectrum of a Daylight Fluorescent Tube

Osram L36 W/954 Lumilux de Luxe Daylight / 2300 lm

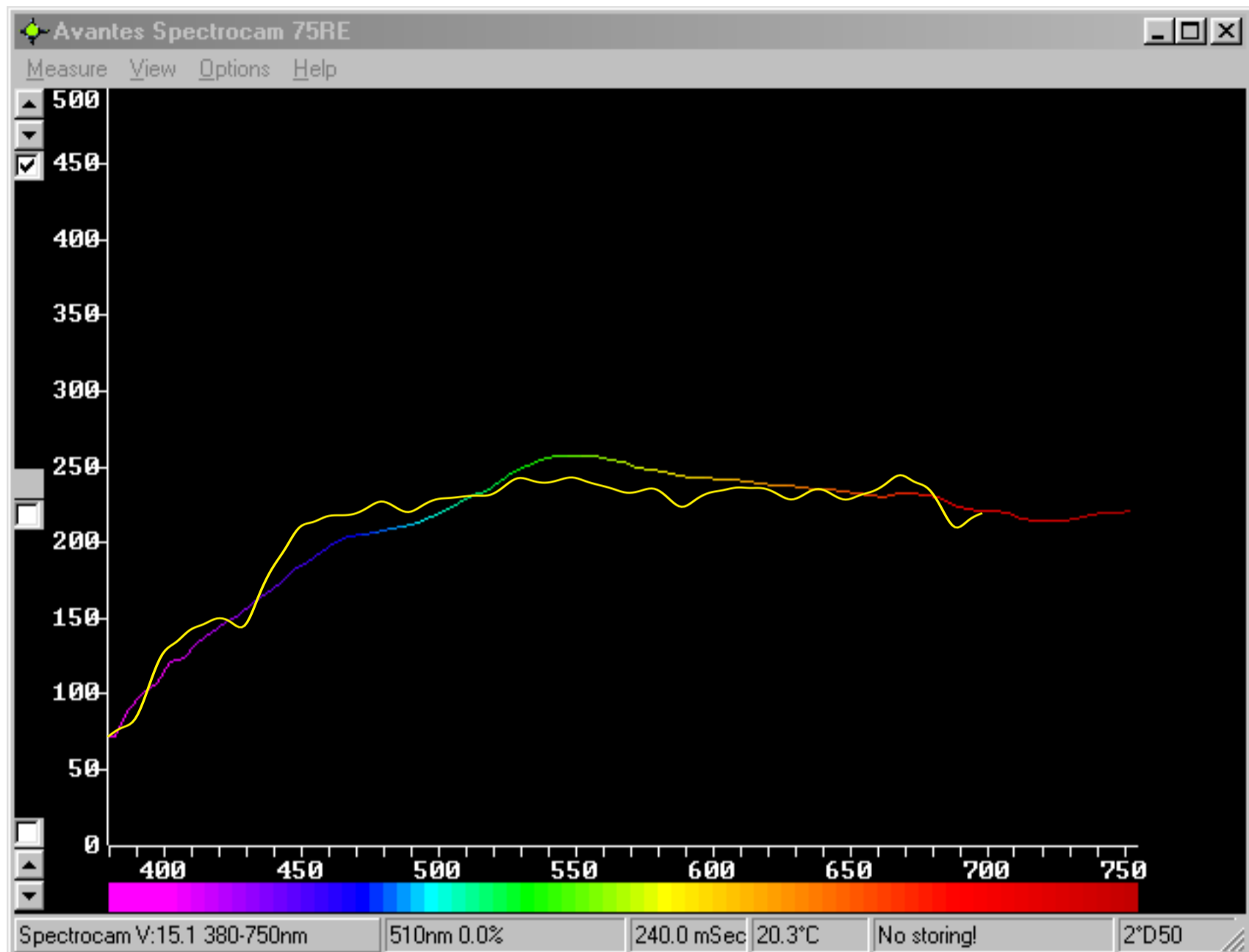
Best view 72dpi / zoom 100%



4. Spectrum of a SoLux D50 Halogen Lamp

SoLux 36° / Flood / 4700K / 12V / 50W : available at EIKO-Europe [2]

Best view 72dpi / zoom 100%



Color: SoLux

Yellow: D50, manual curve fitting



Measuring the correlated color temperature as a function of the current. Spectrocam, using a paper reflector.

$$T_c / K = 3450 + 1100 (I/A - 3.0)$$

Necessary current for a given CCT:

$$I/A = 3.0 + (T_c / K - 3450) / 1100$$

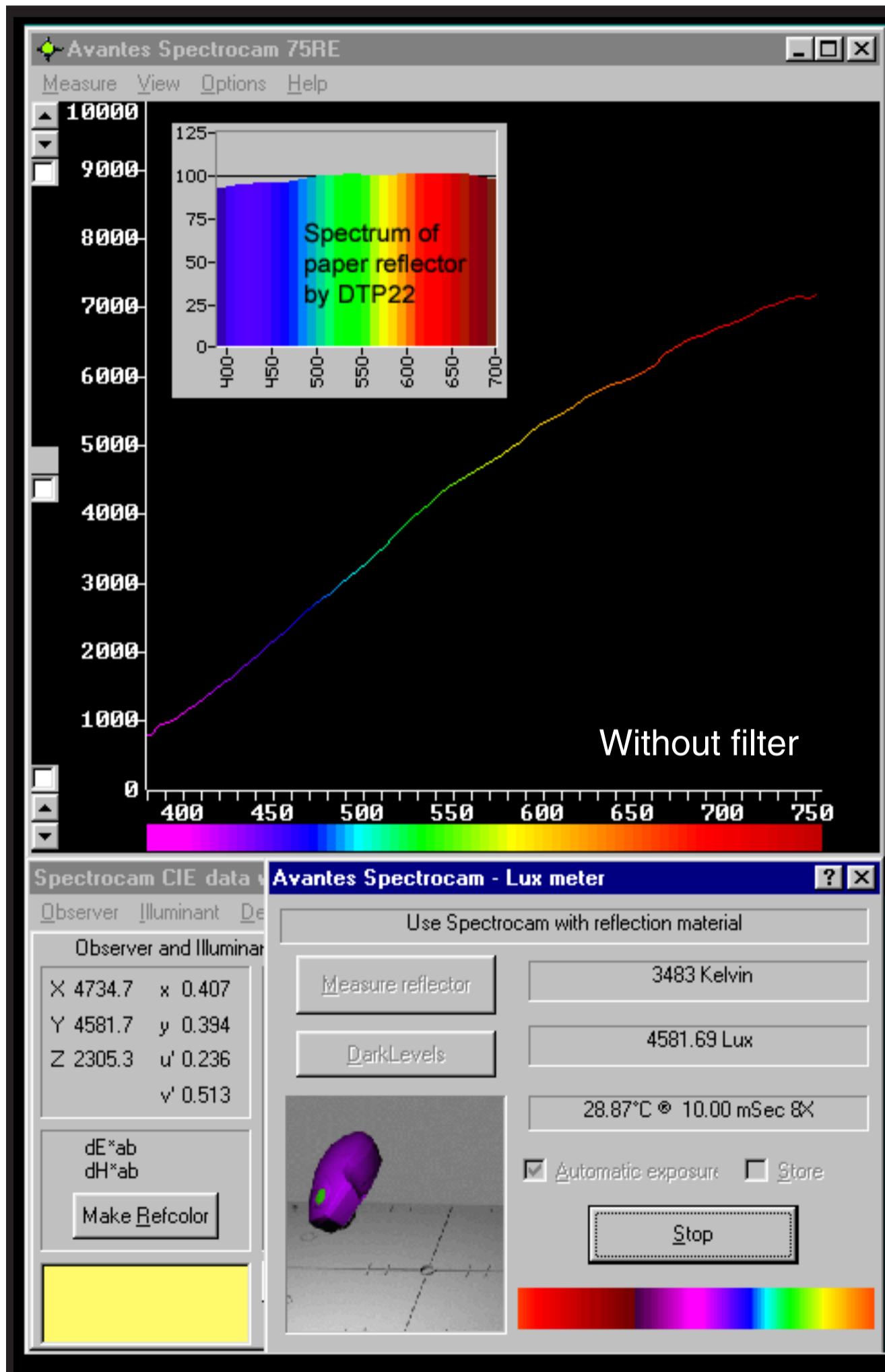
Valid for $I = 3.0A$ to $4.7A$

Photo by *museum camera* MinoltaRD175 (1999). With flash, 2006.

5.1 Spectrum of Kaiser Videolight 4

Kaiser is a German manufacturer of photo equipment. This is the spectrum of Videolight 4 (tungsten halogen).

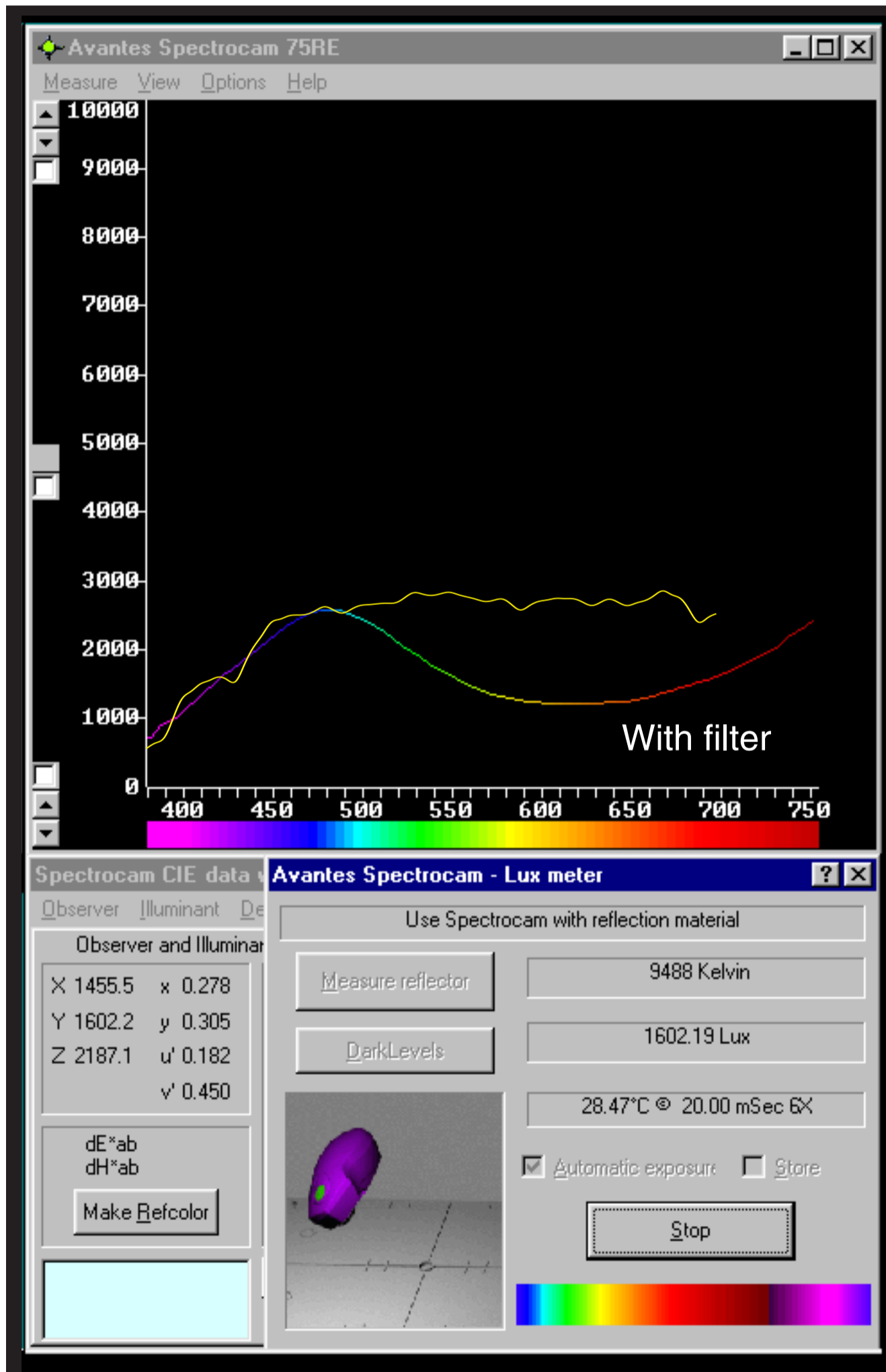
Best view 72dpi / zoom 100%



5.2 Spectrum of Kaiser Videolight 4 with 5000K Filter

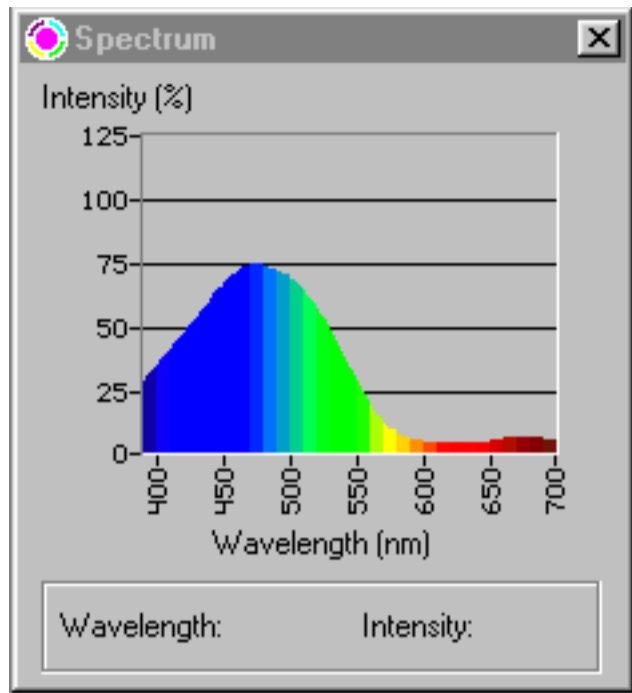
This is the spectrum of Videolight 4 with a 5000K conversion filter. Obviously it is not a 5000K spectrum - the light is blue-ish. Kaiser did not comment these measured results.

Best view 72dpi / zoom 100%

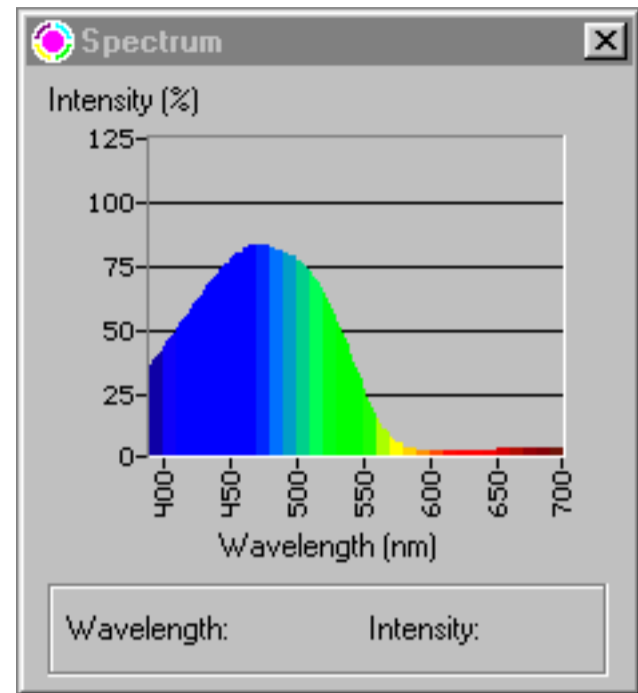


Color: Kaiser Videolight with filter
Yellow: D50, manual curve fitting

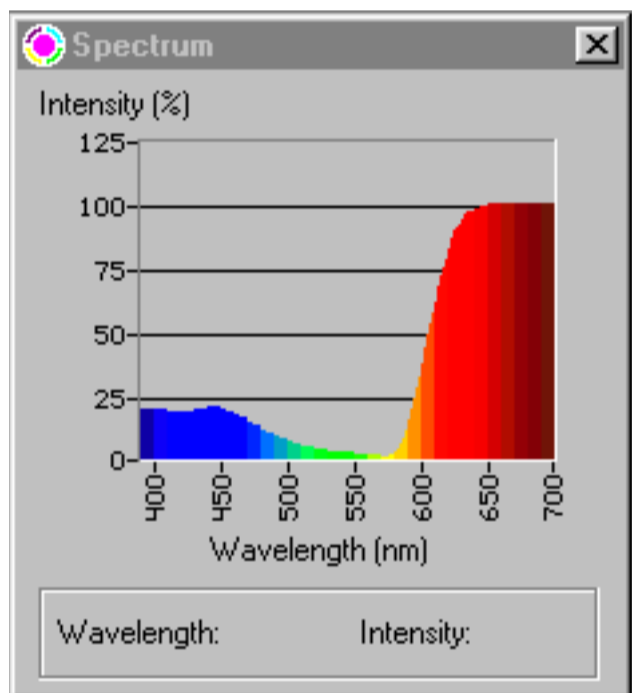
6. Spectra of Offset Inks and Pigment Inks under D50



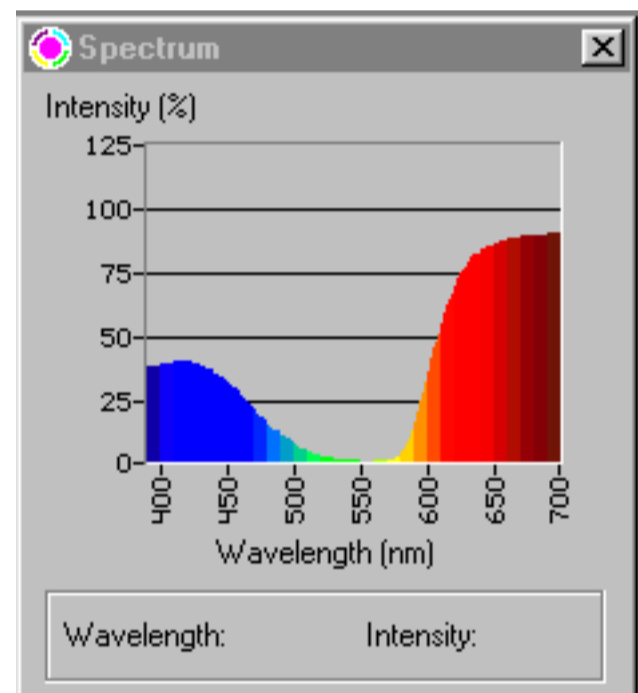
Pantone Process Cyan



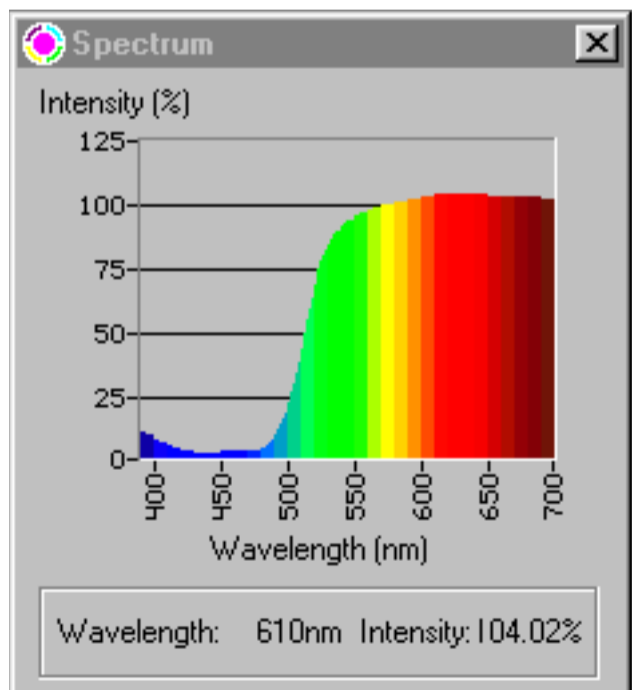
Mutoh Inkjet Cyan



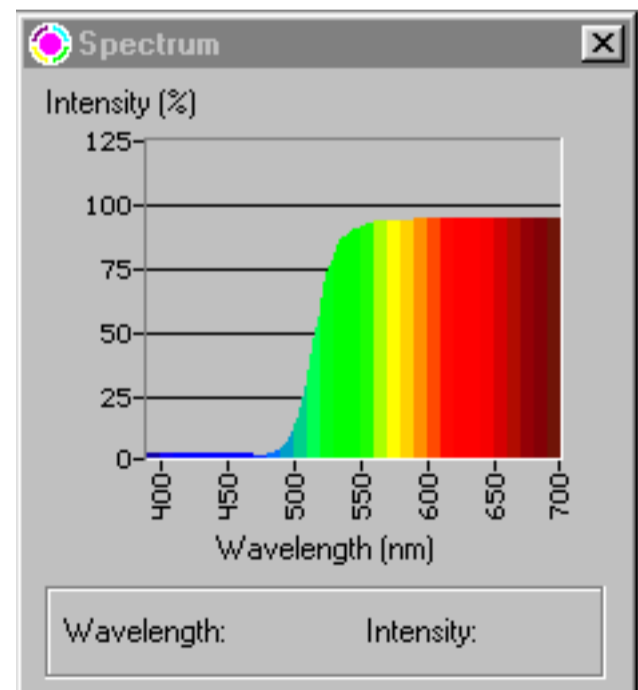
Pantone Process Magenta



Mutoh Inkjet Magenta

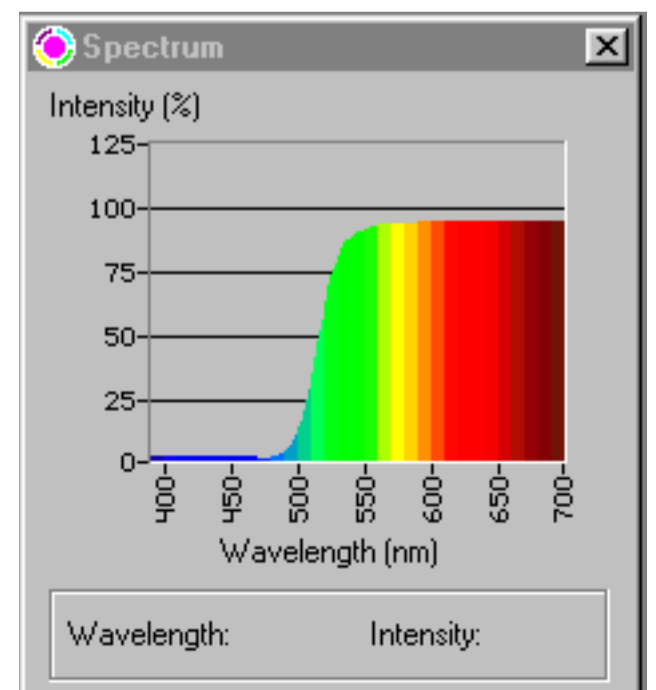
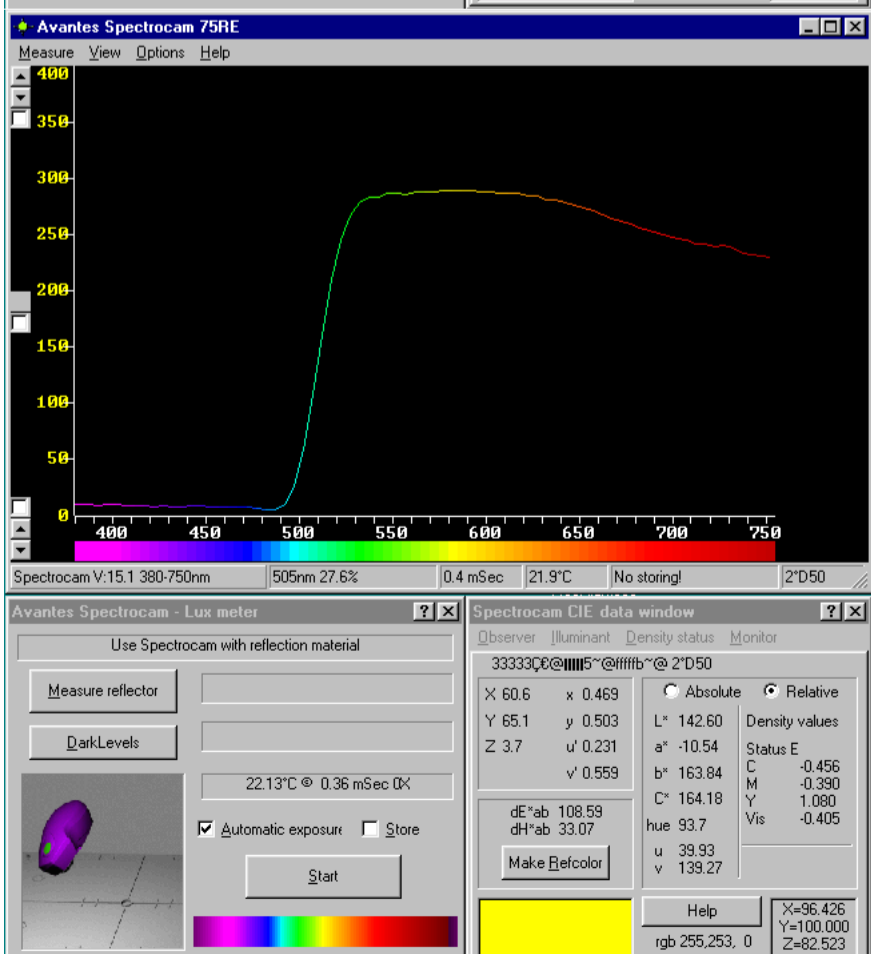
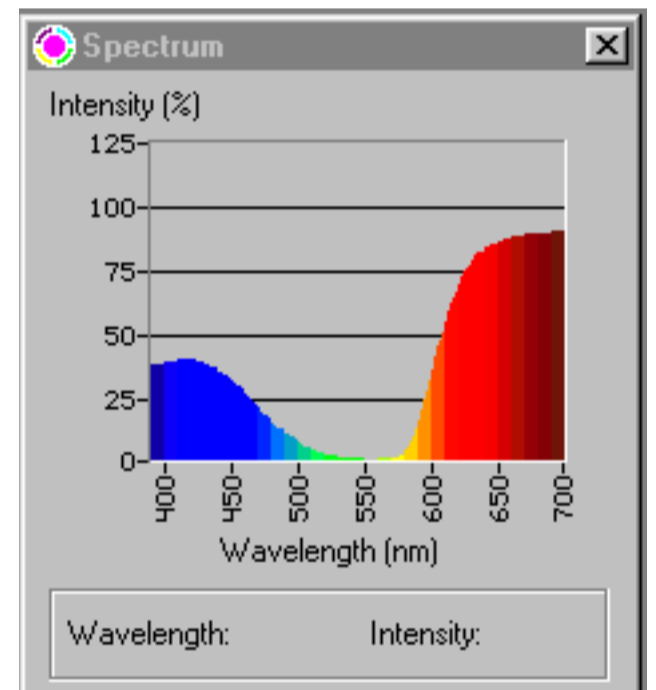
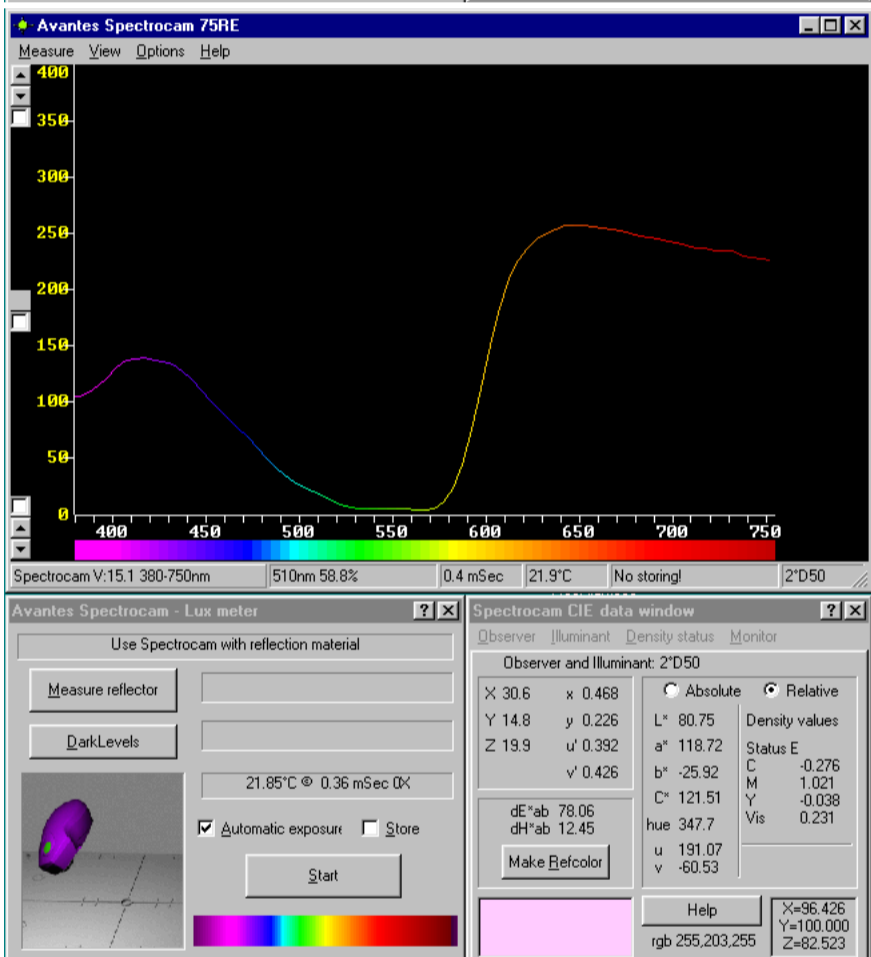
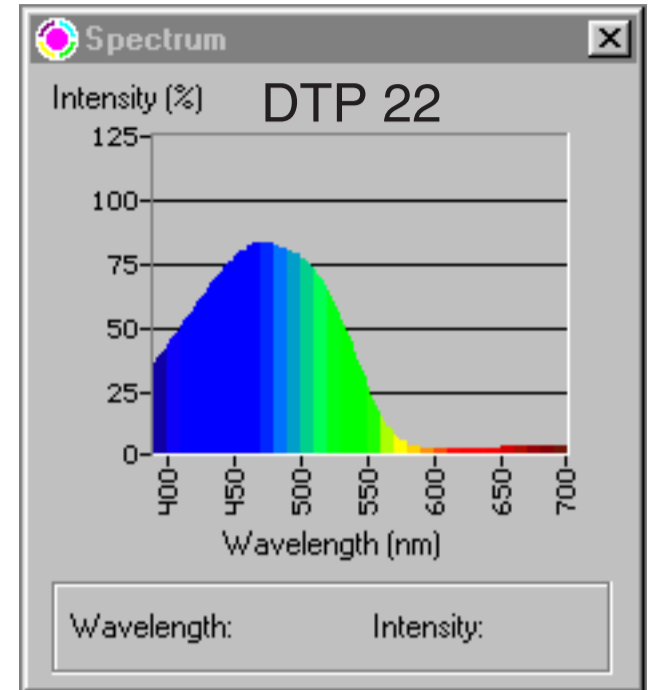
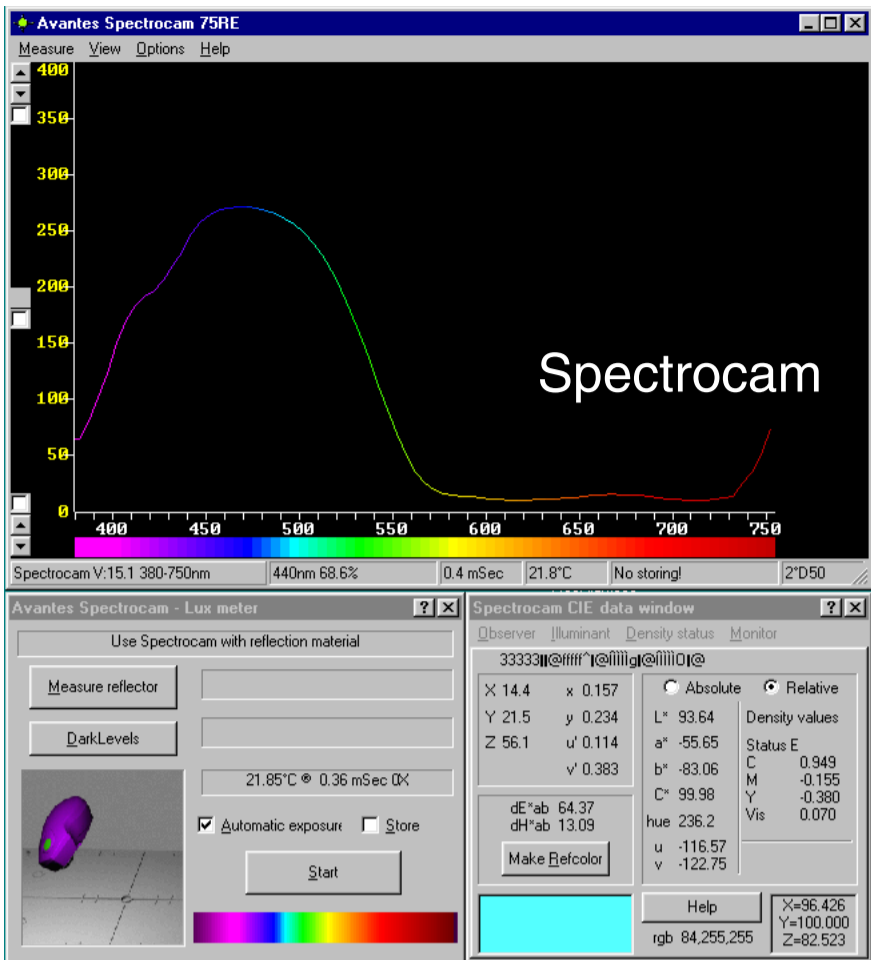


Pantone Process Yellow

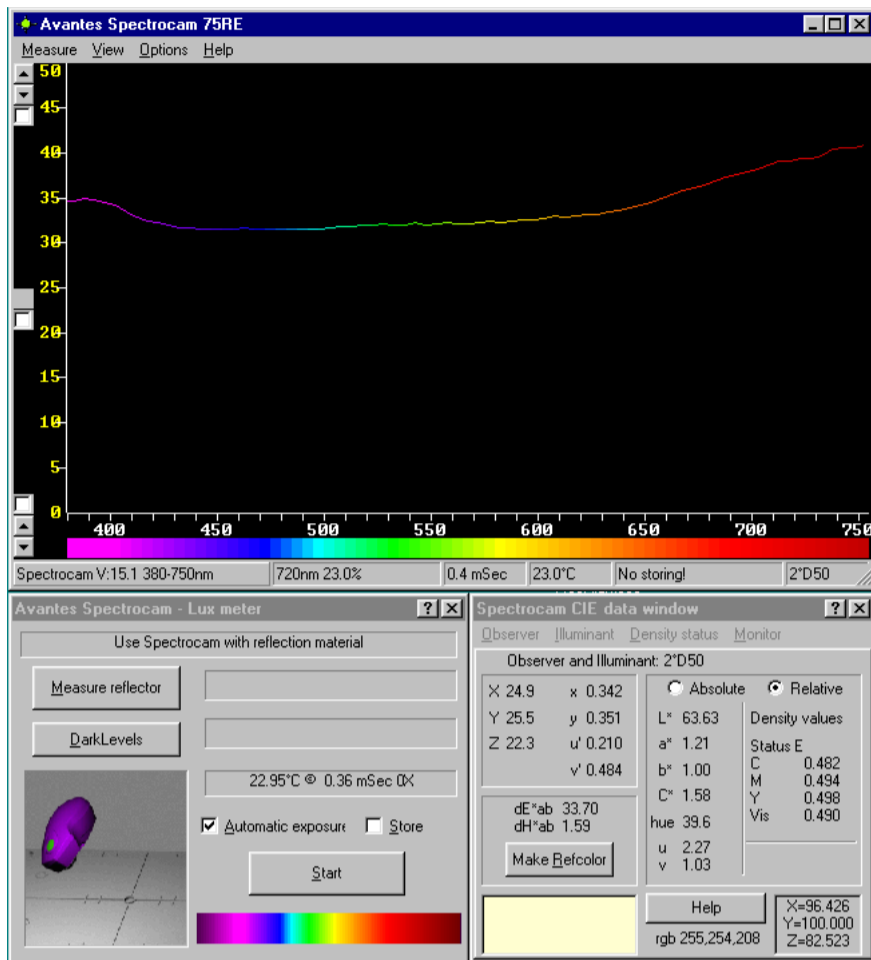


Mutoh Inkjet Yellow

7. Spectra of Pigment Inks under D50



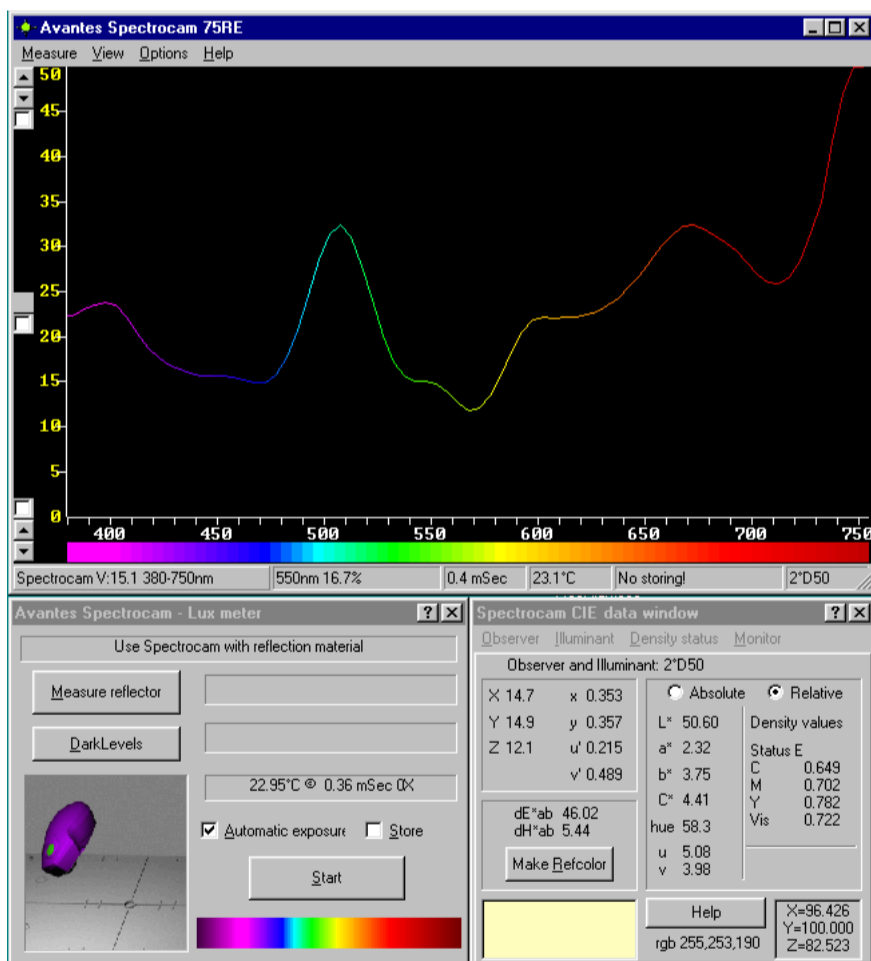
8. Spectra of K-only Gray and CMYK Gray under D50



K-only Gray

View 72dpi / zoom 200%

Measured by Spectrocam

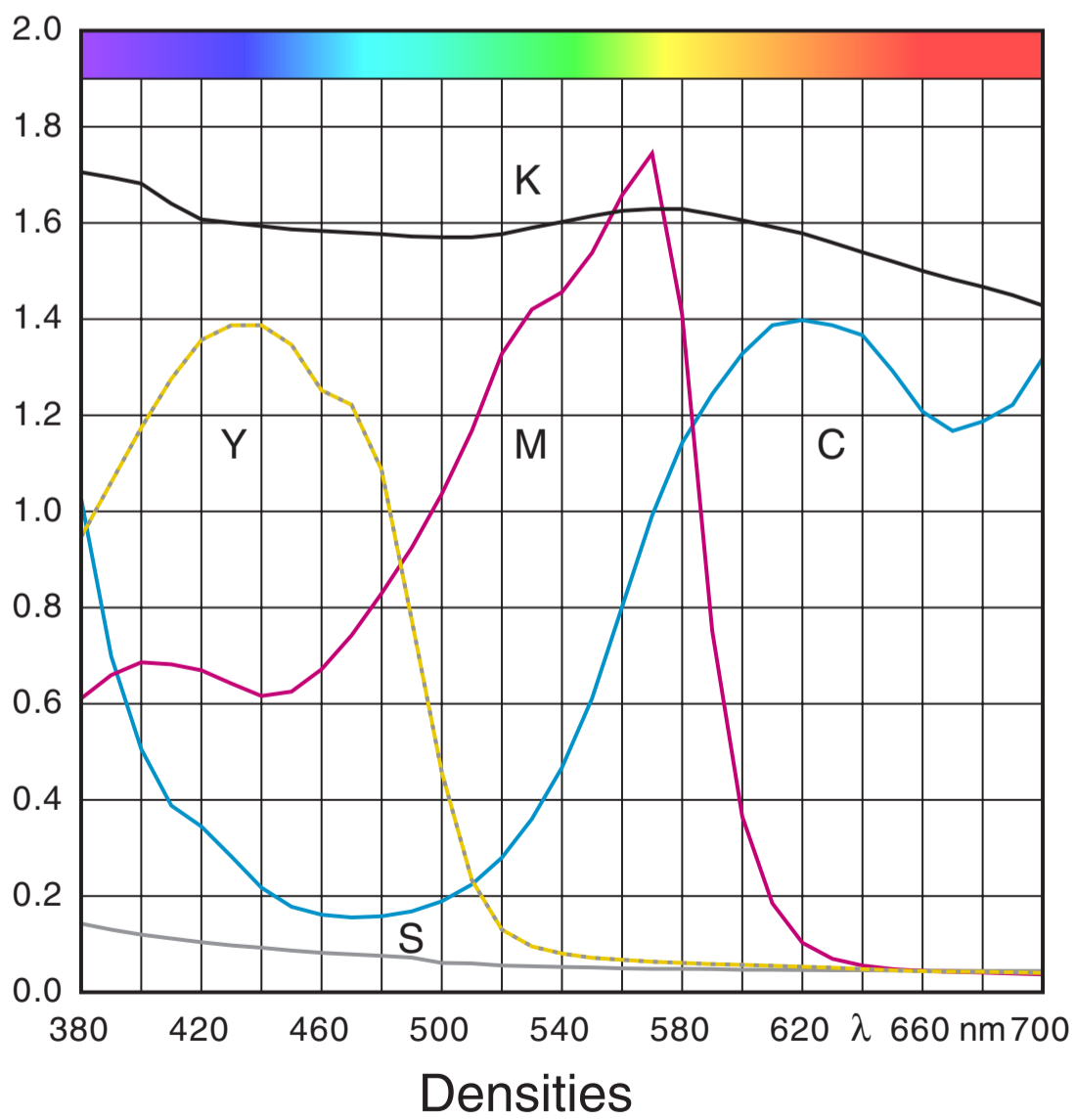
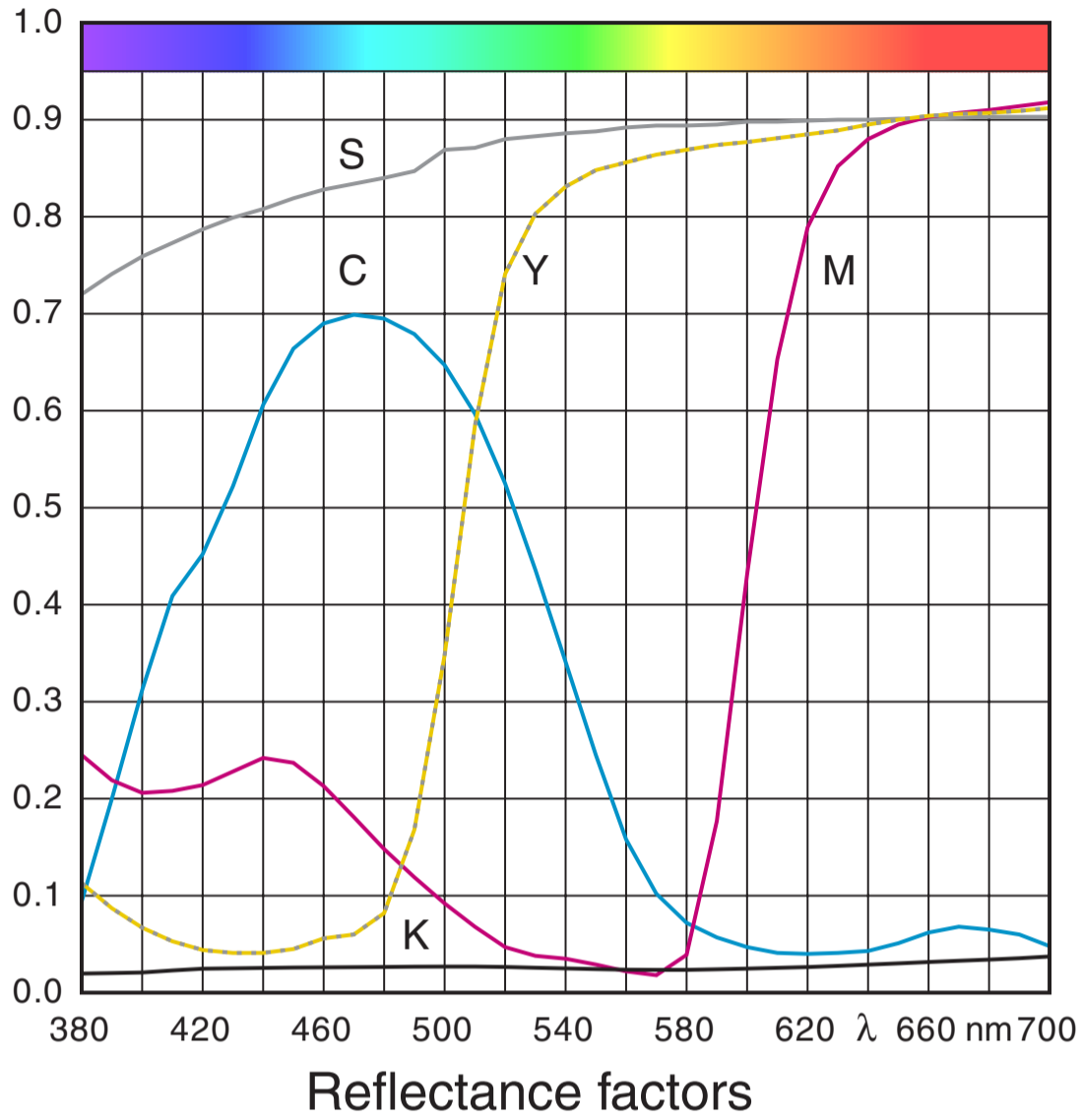


CMYK Gray

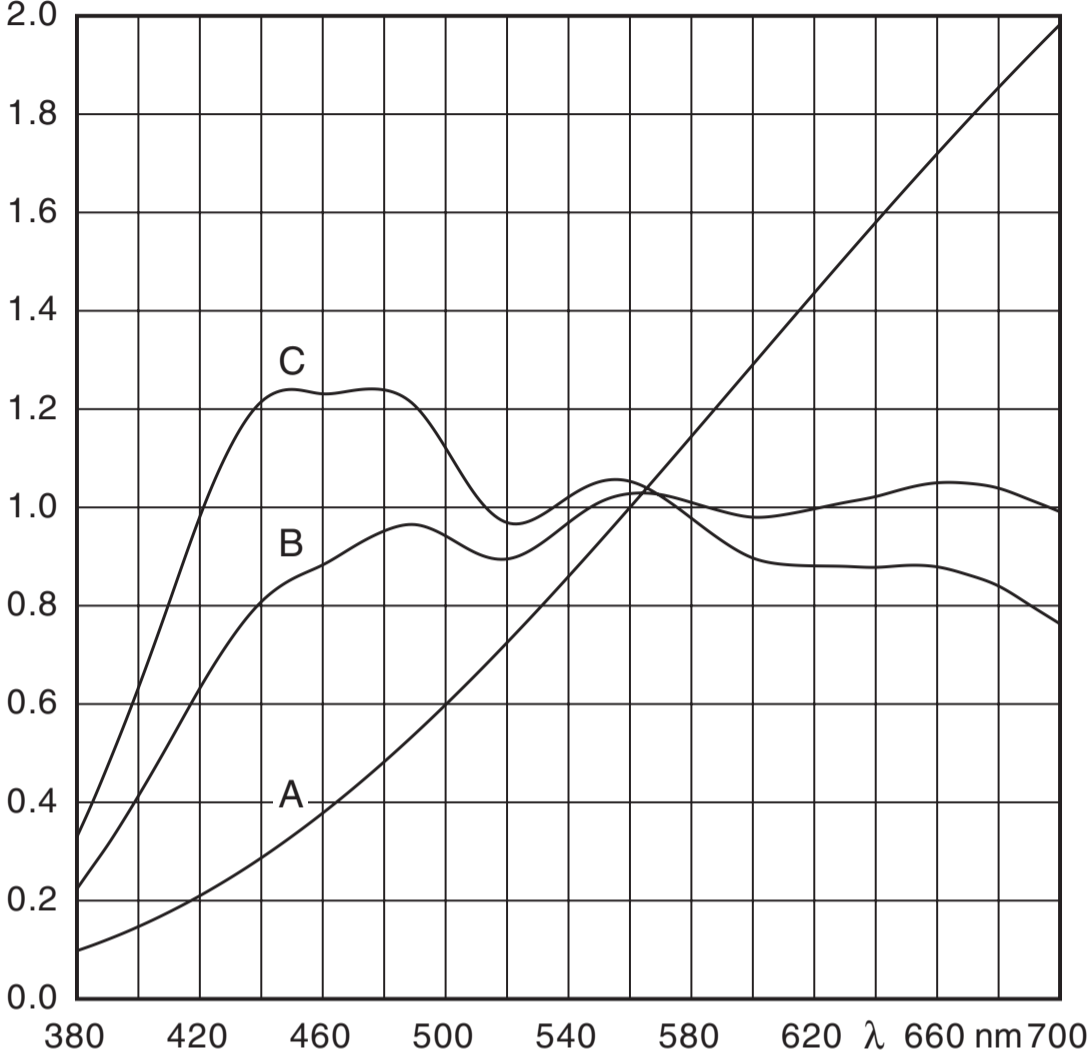
The K-only print has a flat spectrum. The CMYK print shows peaks.

The simulated D50 light spectrum (fluorescent) has also peaks, therefore green tints can be expected.

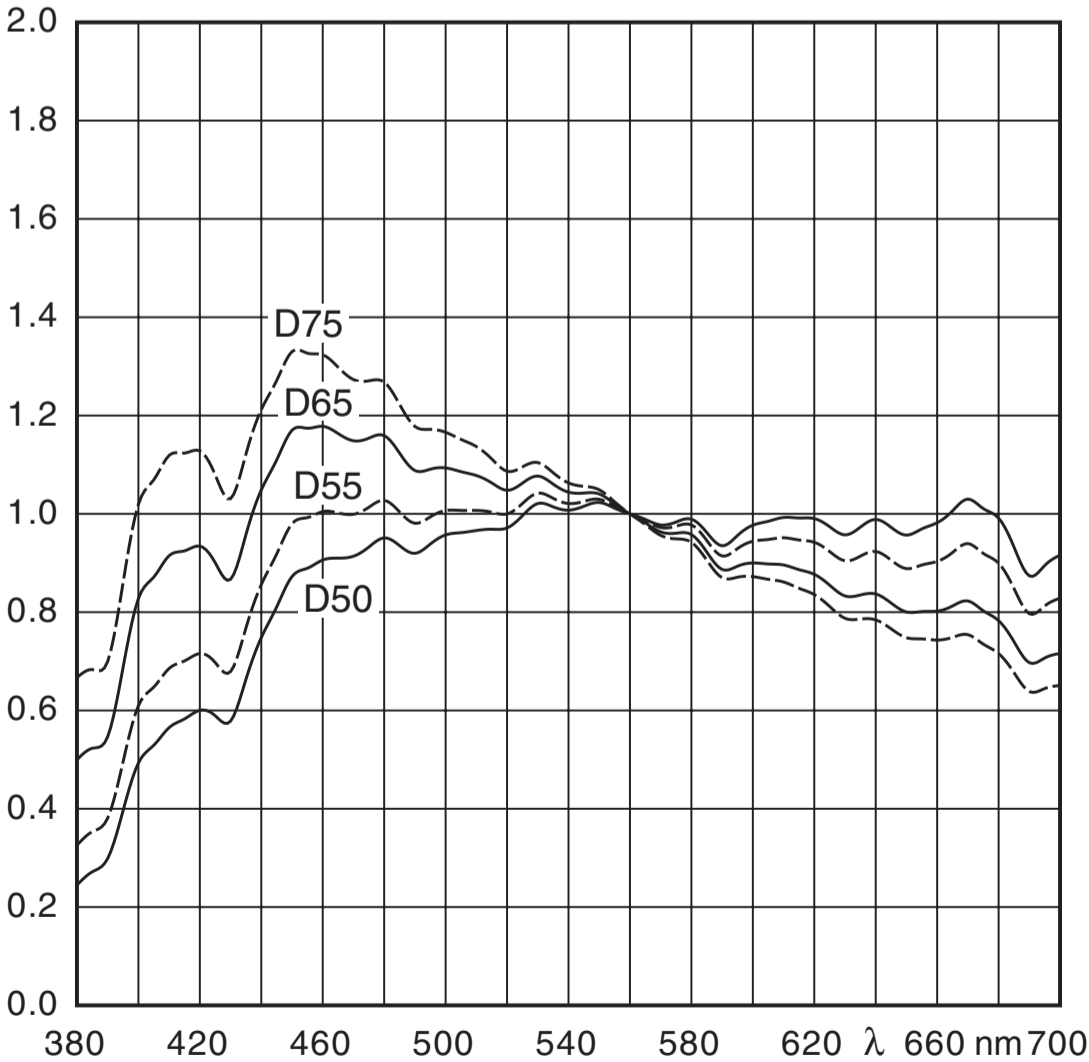
9. Spectra of Offset Inks ISO 2846-1:1997 (45°/0°)



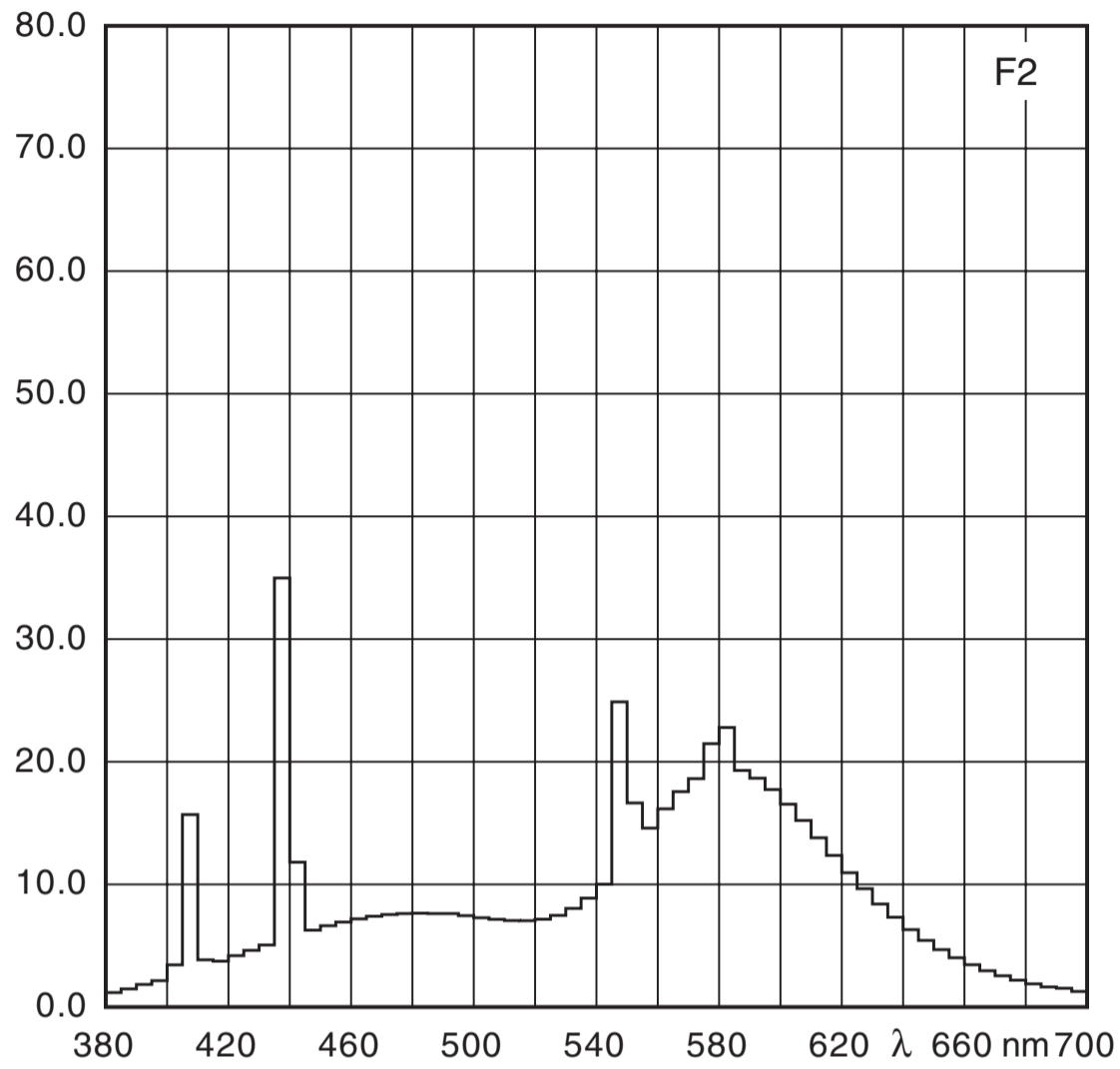
10. Standard Illuminant Spectra [1]



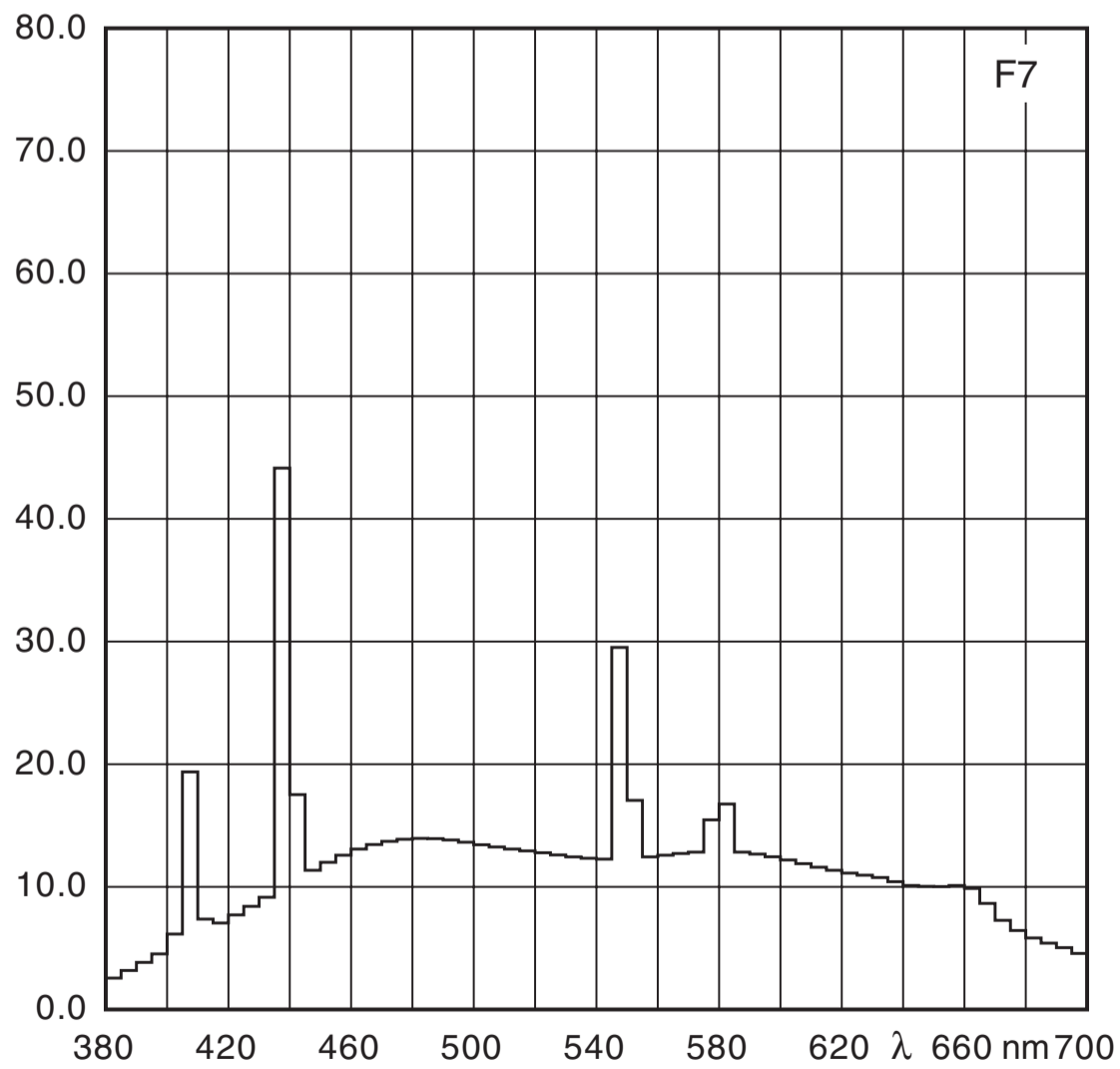
Illuminant A is the Planckian radiator 2856K



11. Fluorescent Spectra [1]



Normal Type F2



Broad-band Type F7

12. Daylight Mini-Lamp



The daylight mini-lamp consists of these components:

1. Electronic transformer. AC 230V input, DC 11.5V output.
2. Fixture, front part cut.
3. Reflector ring: fixes bulb, prevents lamp from emitting light to the side. Optimized for the suppression of unwanted patterns.
4. SoLux bulb. Spectrum in chapter 4.
SoLux 36° / Flood / 4700K / 12V / 50W / Ordering code 18003.

This lamp can be manufactured in small quantities.

Applications:

Proofing light
Photo light
Microscope light
Mobile light

13. Daylight Photo-Lamp



The daylight photo-lamp consists of these components:

1. Aluminium carrier for tubes with diameter 40mm.
2. Aluminium fixture.
3. Aluminium gimbal.
4. Electronic transformer. AC 230V input, DC 11.5V output.
5. SoLux bulb. Spectrum in chapter 4.
SoLux 36° / Flood / 4700K / 12V / 50W / Ordering code 18003.

Applications:

Proofing light

Photo light

Main contributors:

Daniel Holl (carrier design), Sara Hoffmann (fixture design), Jürgen Hoffmann (pattern maker, cast aluminium), Lutz Krause (CNC manufacturing), Gernot Hoffmann (supervisor).

14. Exhibition Lighting by SoLux Lamps



The system for travelling exhibitions consists of these components:

1. Aluminium carrier for tubes with diameter 25mm.
2. Aluminium fixture.
3. Cases for transformers and connectors.
4. Electronic transformers. AC 230V input, DC 11.5V output.
5. SoLux bulb. Spectrum in chapter 4.
SoLux 36° / Flood / 4700K / 12V / 50W / Ordering code 18003.

Main contributors:

Abraham Widjaja (mechanical design), CWtech (CNC manufacturing), Gernot Hoffmann (supervisor).

15. References

- [1] R.W.G.Hunt
Measuring Colour
Fountain Press England 1998
- [2] EIKO-Europe GmbH
Mittelwegring 23
D-76751 Jockgrim
Germany
www.eiko-europe.de

This doc
<http://docs-hoffmann.de/prooflight18092003.pdf>

Gernot Hoffmann
September 18 / 2003 — February 11 / 2013
Website
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