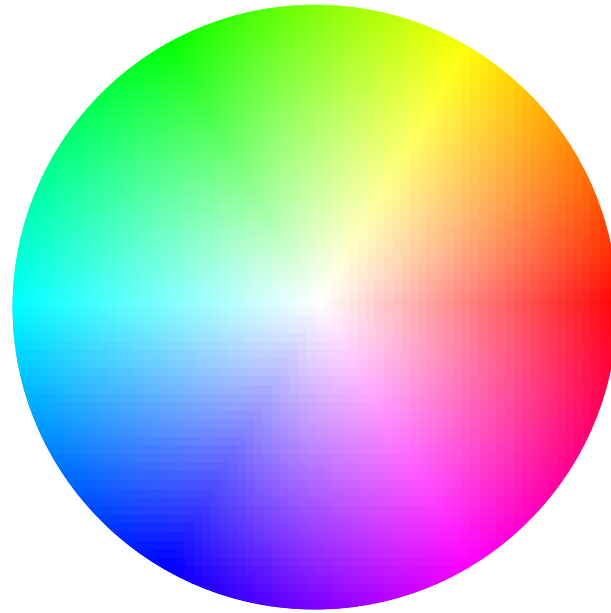


# Gernot Hoffmann

## Graphics for Color Science



### Table of Contents

1.	Introduction	2
2.	Color-Matching Functions RGB	3
3.	Color-Matching Functions XYZ	4
4.	Cone Response	5
5.	Chromaticity Diagram with Color Temperatures	6
6.	Chromaticity Diagram with Gamut Triangles	7
7.	Chromaticity Diagram Lu'v'	8
8.	CIELab Gamut Volume for sRGB	9
9.	CIELab Wireframe for CIE-RGB / NTSC / RGB	10
10.	CIELab and sRGB Numbers	11
11.	Ink Spectra ISO 2846-1 (Reflectance, 0/45° Geometry)	12
12.	Ink Spectra ISO 2846-1 (Reflectance, 8°/Diffuse Geometry)	13
13.	Ink Spectra ISO 2846-1 (Density, 0/45° Geometry)	14
14.	Ink Spectra ISO 2846-1 (Density, 8°/Diffuse Geometry)	15
15.	Daylight ABC	16
16.	Daylight Dxx	17
17.	Fluorescent	18
18.	Additive versus Subtractive	21
19.	Files	22
20.	References	24

# 1. Introduction

This catalog contains a selection of accurate graphics for color science. Each of them was directly programmed by PostScript as scaleable vector graphic. Shaded areas consist of small squares.

The graphics can be used by various methods in desktop publishing programs like CorelDraw, PageMaker or InDesign:

1. Download the respective file \*.txt  
Rename as \*.eps  
Place EPS in final document  
Scale  
The DTP program should create a *preview* (eventually low resolution)  
This is the best method
2. Place a page of this PDF in final document  
Scale and crop  
The DTP program should create a *preview* (eventually low resolution)  
This is not perfect because the PDF uses a lower number of squares in shaded areas than the EPS
3. Copy and paste a part of this PDF  
Result is a raster image with screen quality  
This is generally not recommended,  
with the exception of Web applications (HTML)

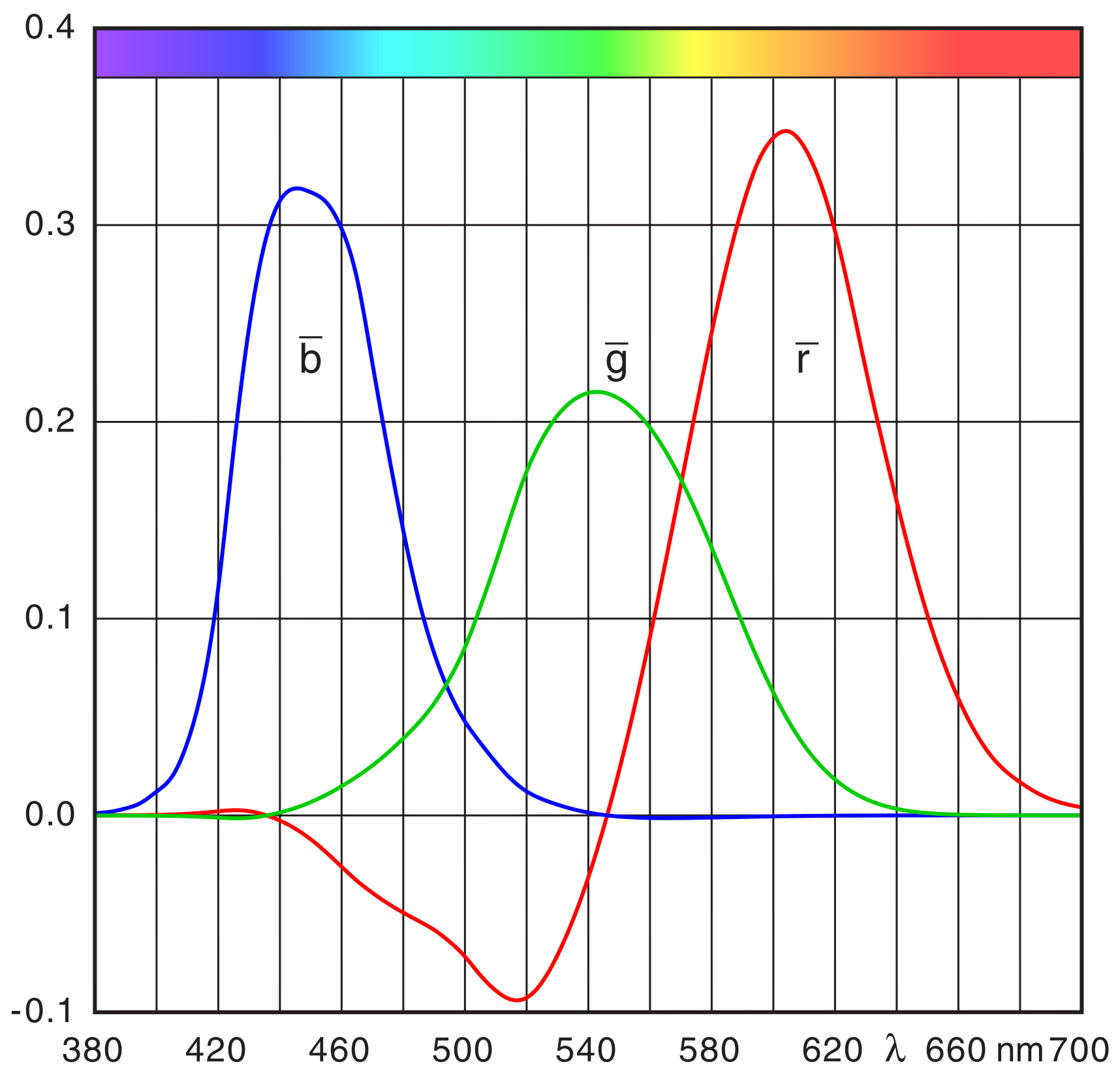
Methods 1 and 2 work in a PostScript workflow. The graphics will be printed by a PS printer with ultimate quality. They will be exported to PDF accurately. Non-PostScript printers (PCL) will show only the low resolution *preview*.

EPS files can be modified by a text editor. E.g. change line widths and colors.

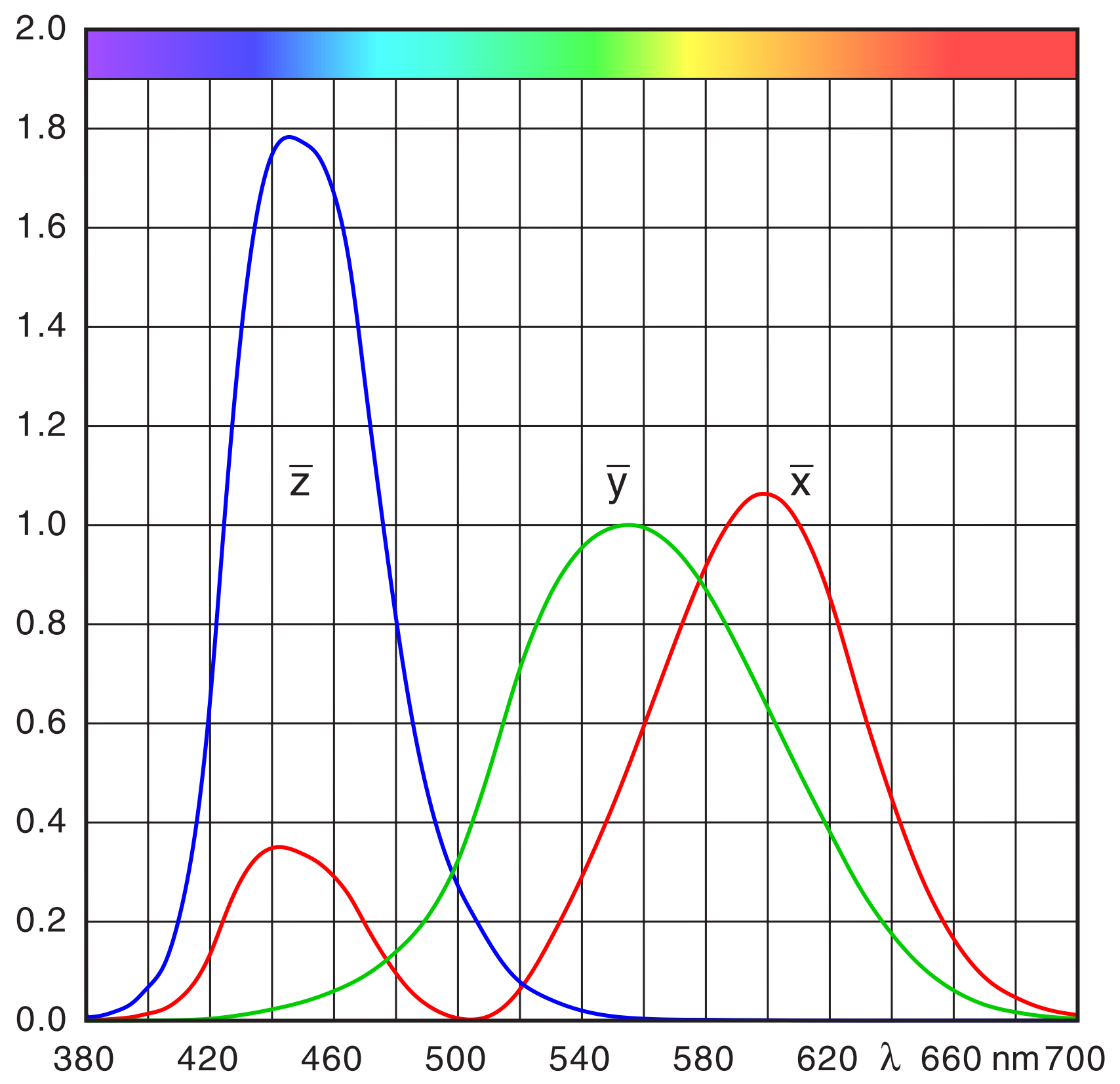
Many other graphics and tutorials with references are available. Please refer to the Website and to the chapter Documents.

The use of the graphics files is free. The author should be mentioned.

## 2. Color-matching Functions RGB



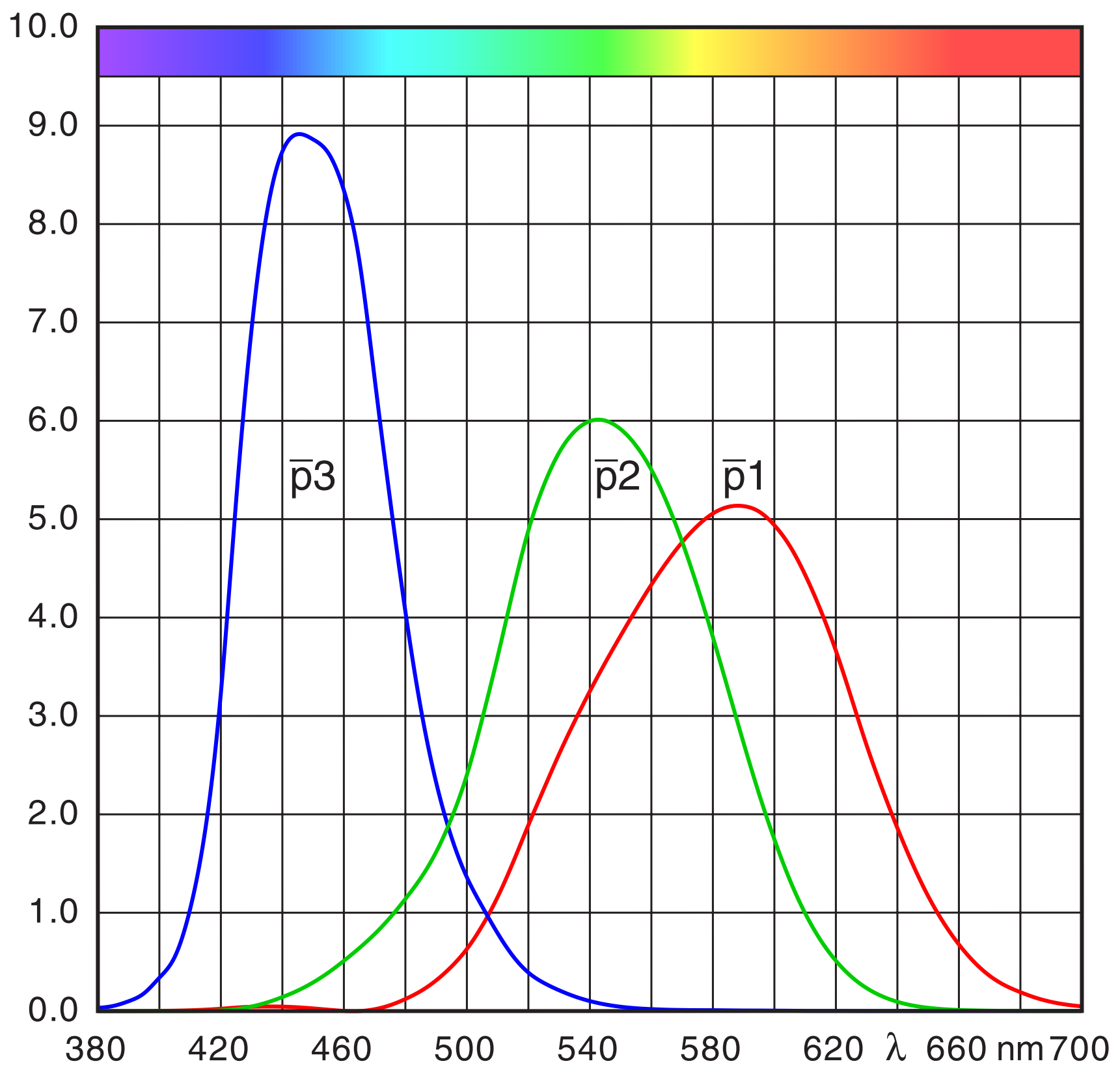
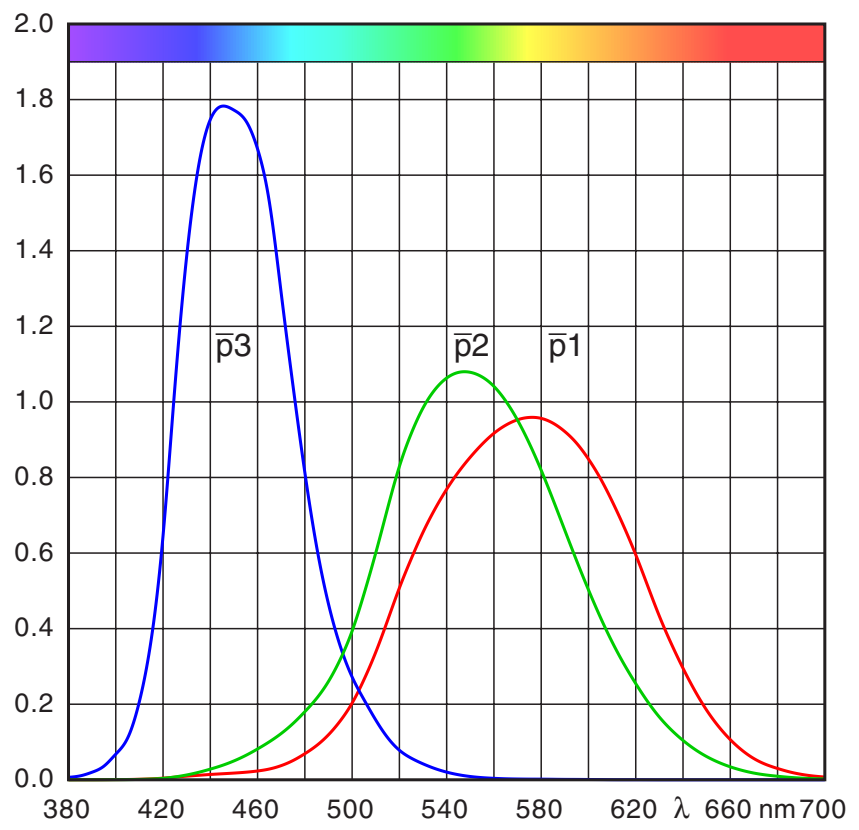
### 3. Color-matching Functions XYZ



# 4. Cone Response

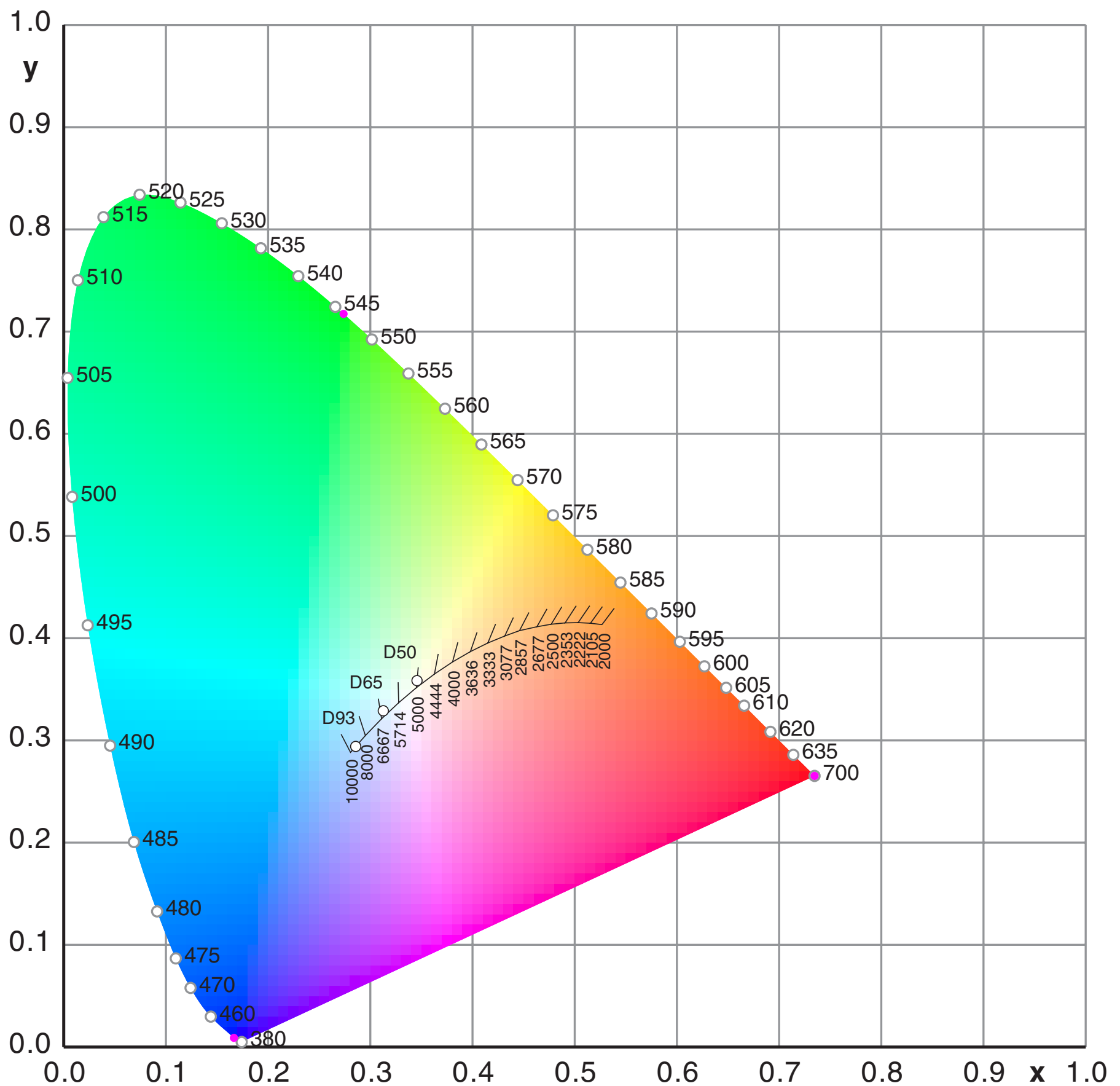
Right [1]

Bottom [2]



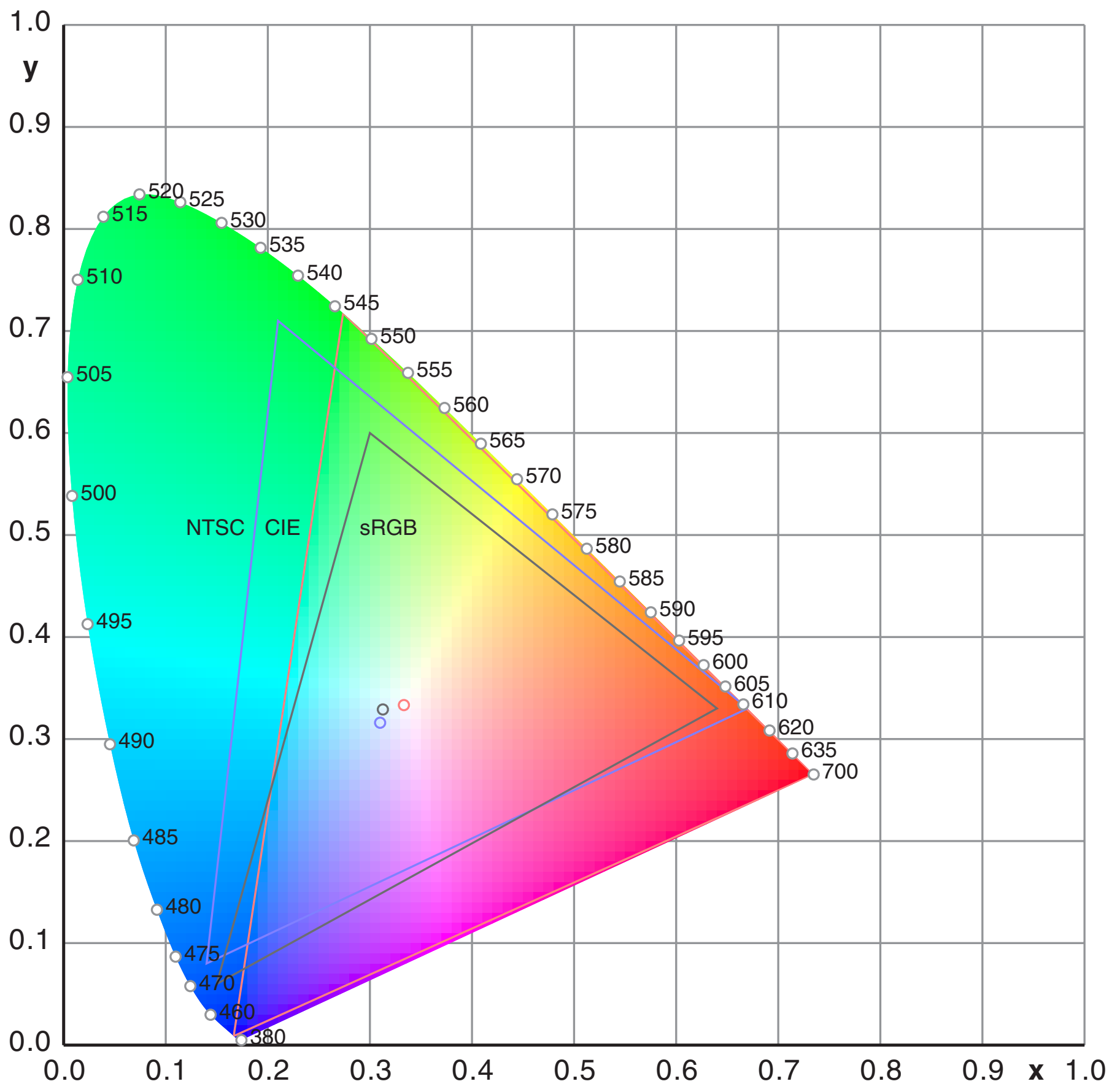
# 5. Chromaticity Diagram with Color Temperatures

This PDF shows visible small boxes. The downloadable source file will create fill patterns without visible boxes.



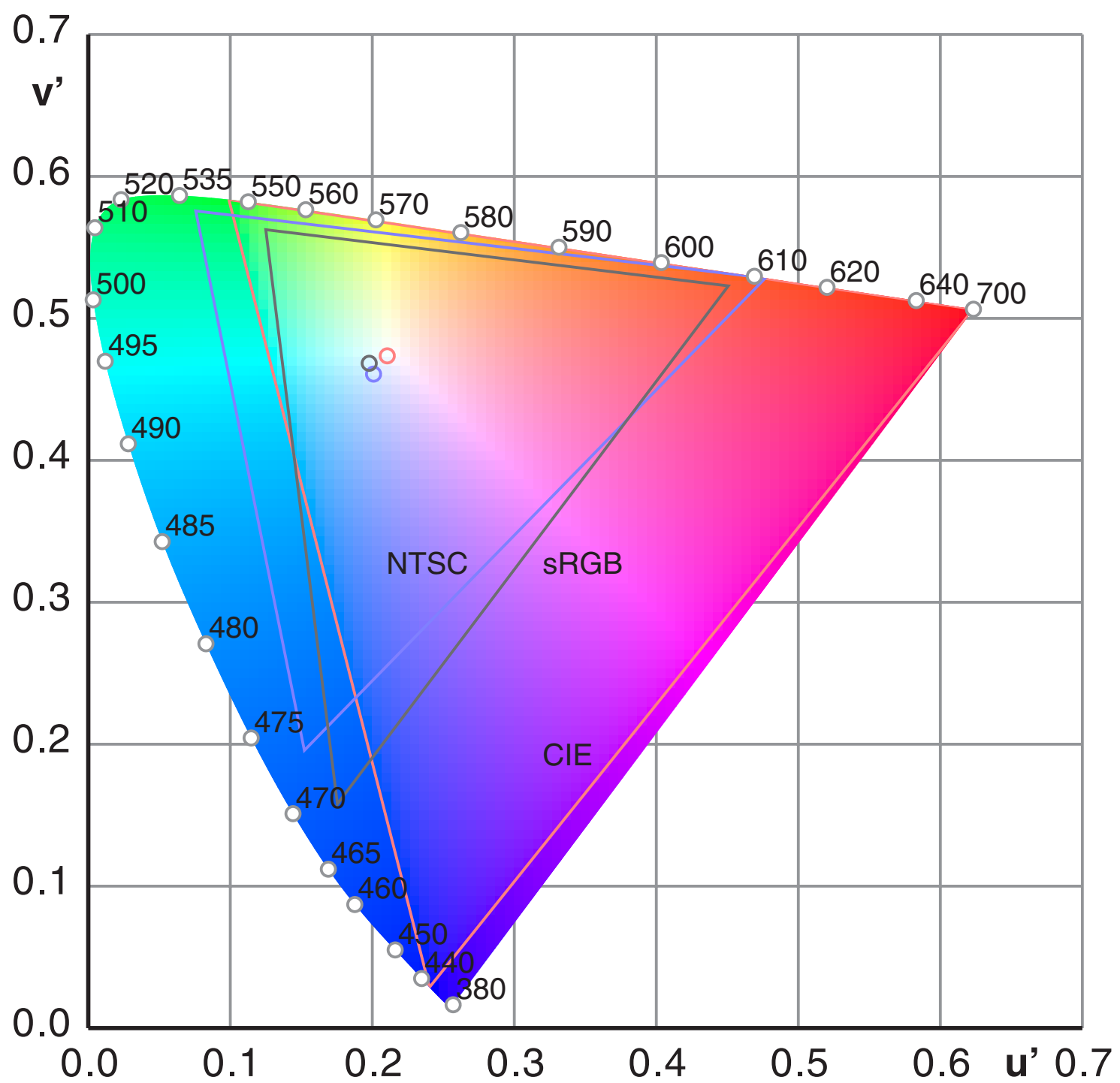
## 6. Chromaticity Diagram with Gamut Triangles

This PDF shows visible small boxes. The downloadable source file will create fill patterns without visible boxes.

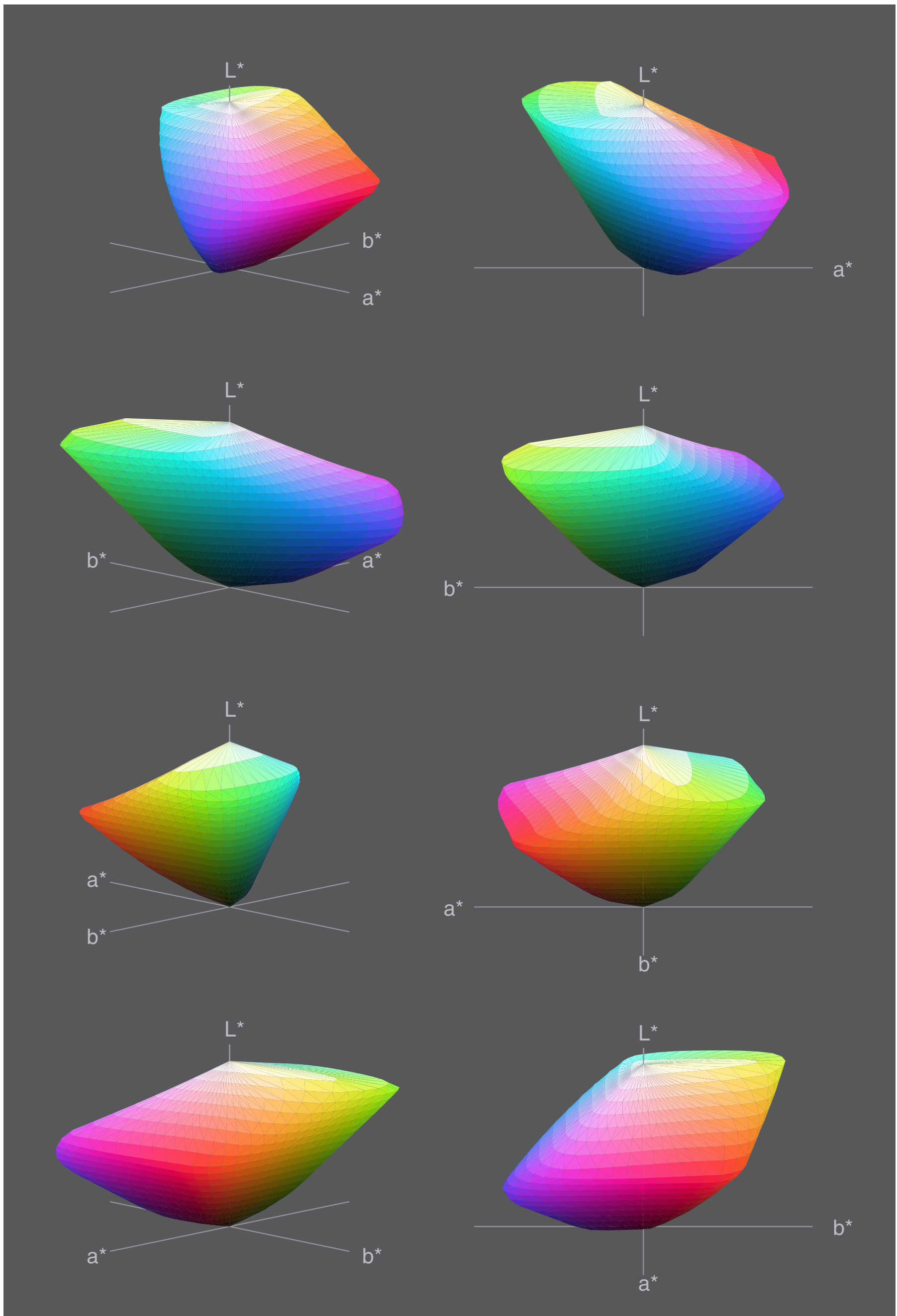


## 7. Chromaticity Diagram Lu'v'

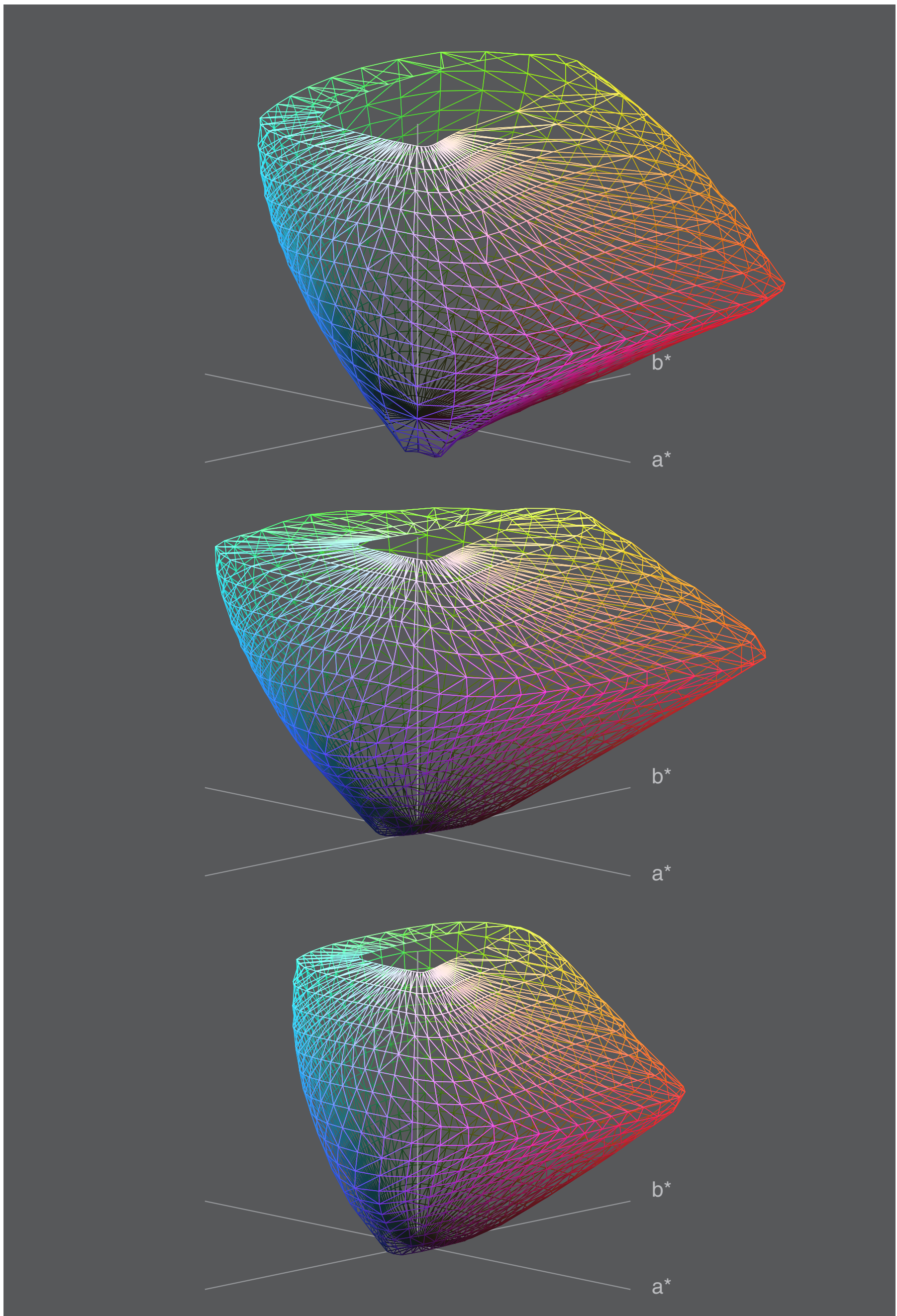
This PDF shows visible small boxes. The downloadable source file will create fill patterns without visible boxes.



## 8. CIE Lab Gamut Volume for sRGB

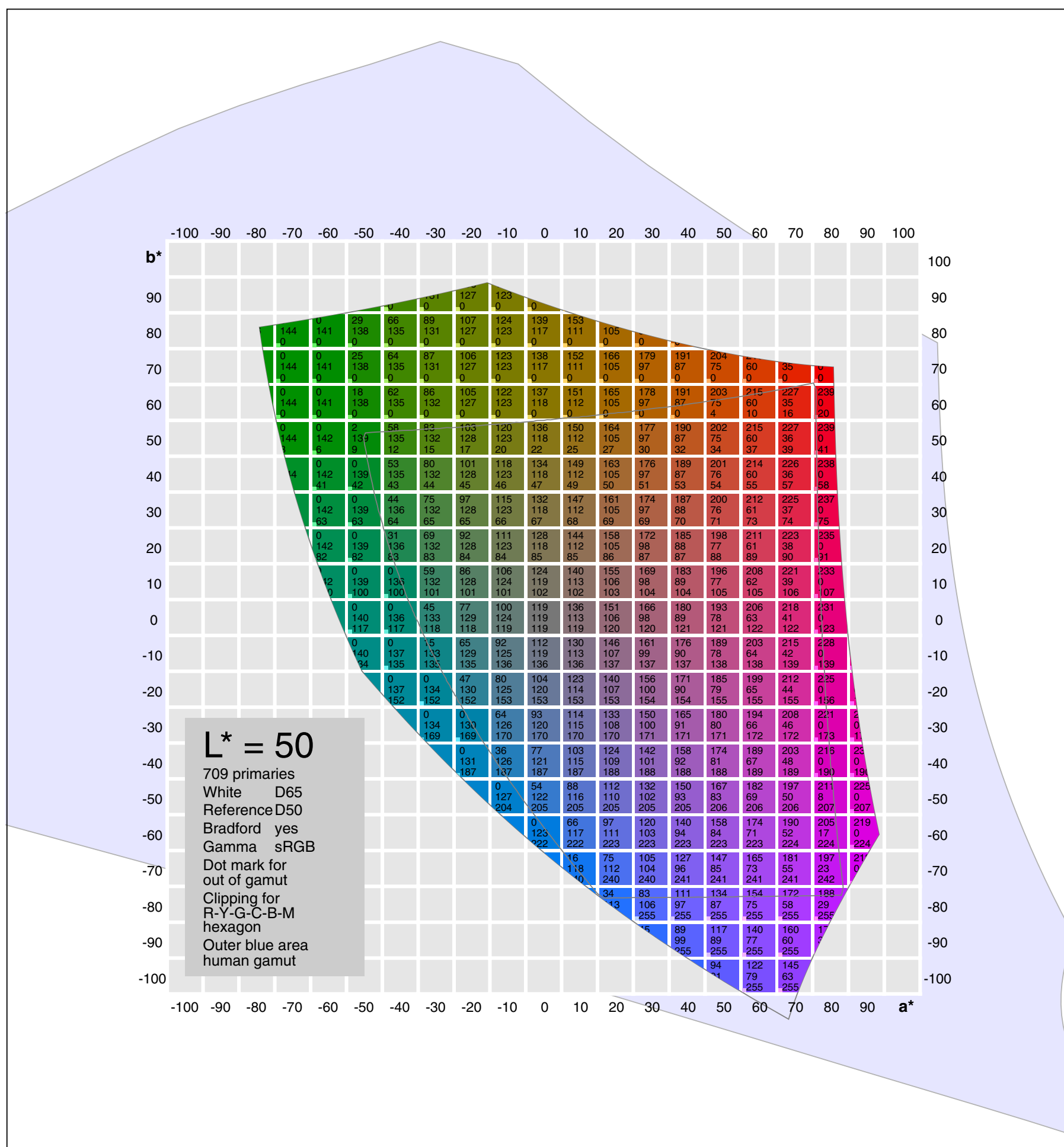


## 9. CIELab Wireframes for CIE-RGB / NTSC / sRGB



# 10. CIE Lab and sRGB Numbers

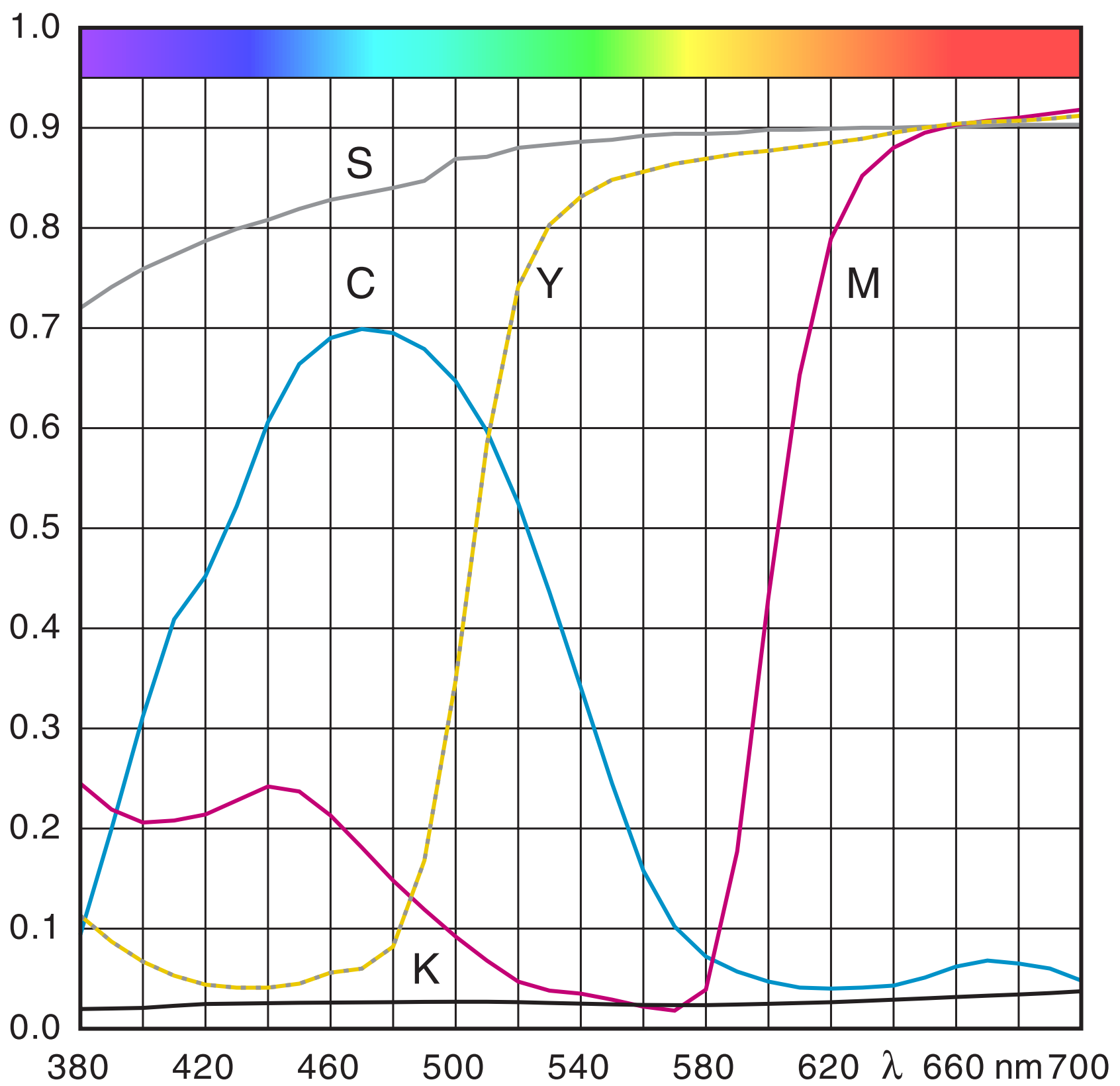
The diagram shows a CIE Lab chart with sRGB values. Out of gamut colors are marked by a dot.



# 11. Ink Spectra ISO 2846-1 (Reflectance, 0°/45° Geometry)

Reflectance factor

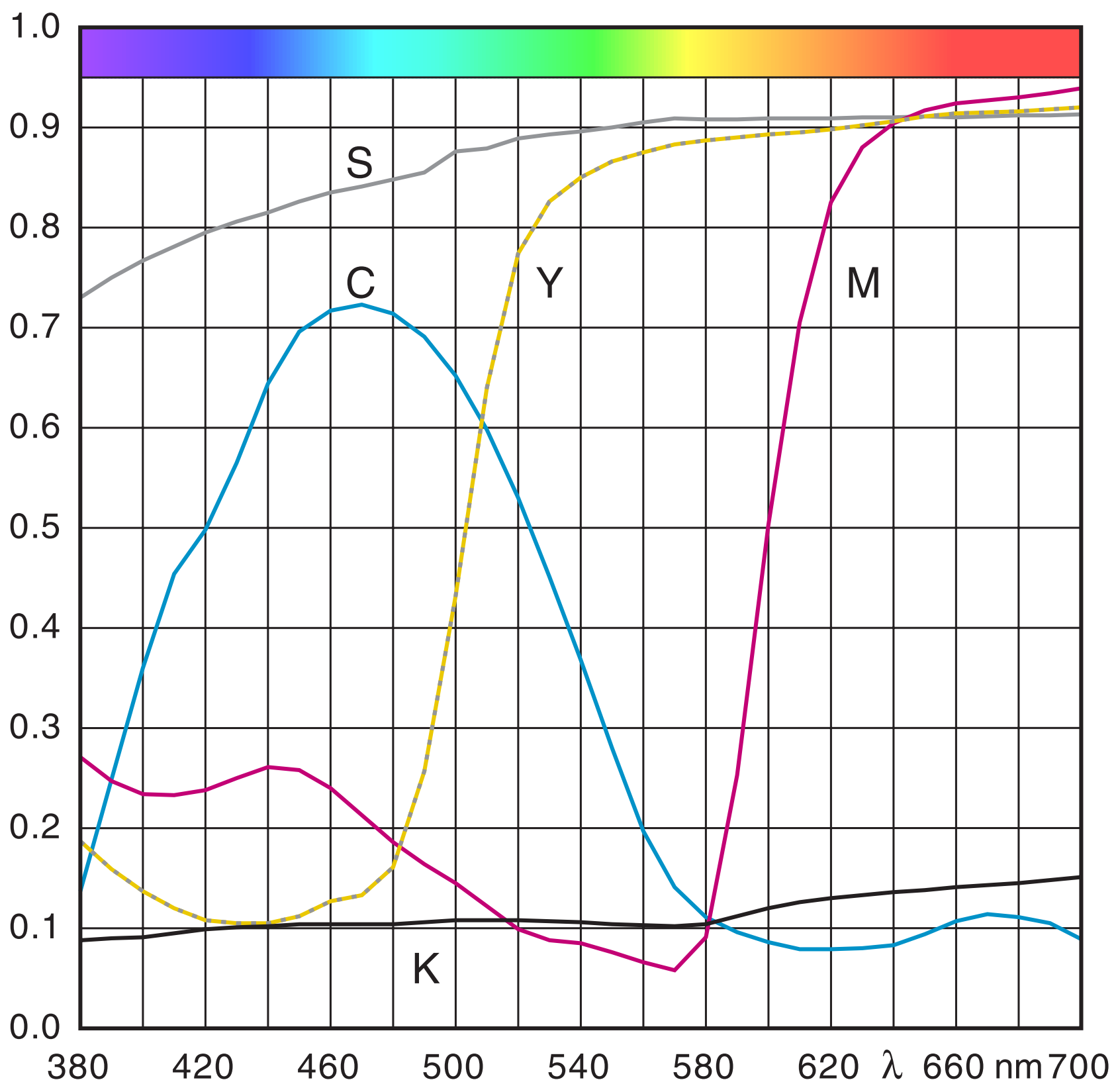
S is the substrate.



# 12. Ink Spectra ISO 2846-1 (Reflectance, 8°/Diffuse Geom.)

Reflectance factor

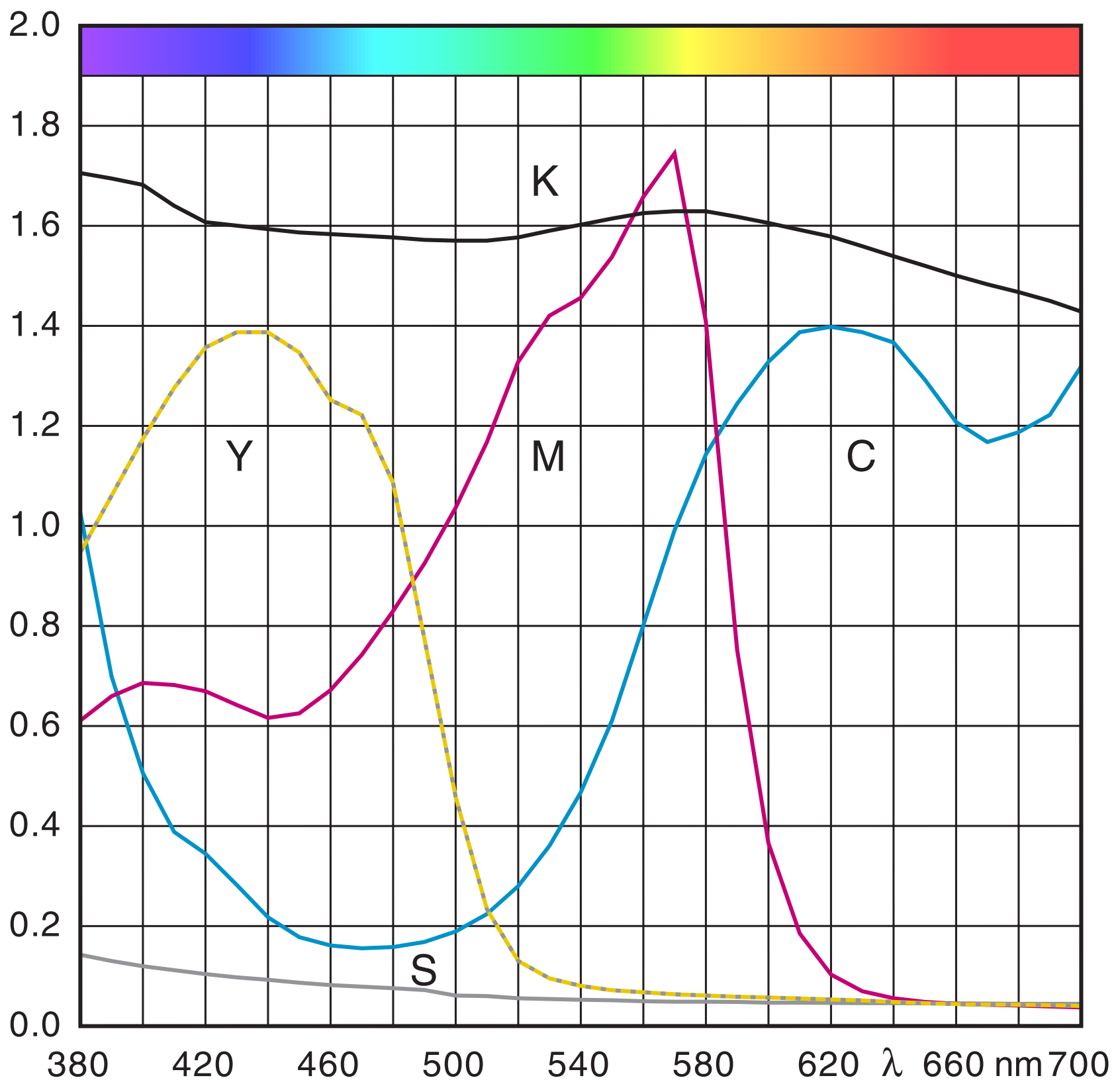
S is the substrate.



# 13. Ink Spectra ISO 2846-1 (Density, 0°/45° Geometry)

Density

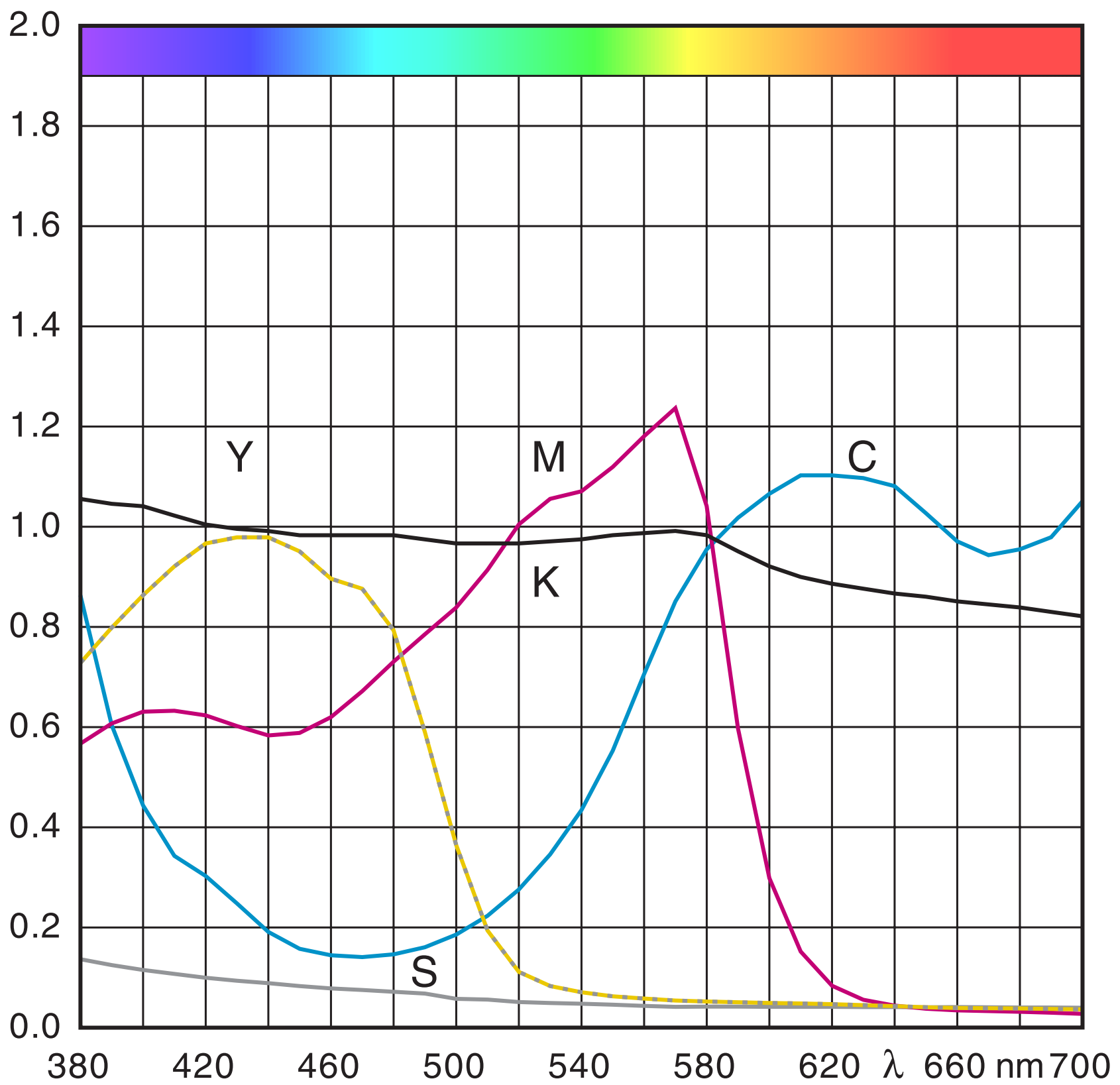
S is the substrate.



# 14. Ink Spectra ISO 2846-1 (Density, 8°/Diffuse Geom.)

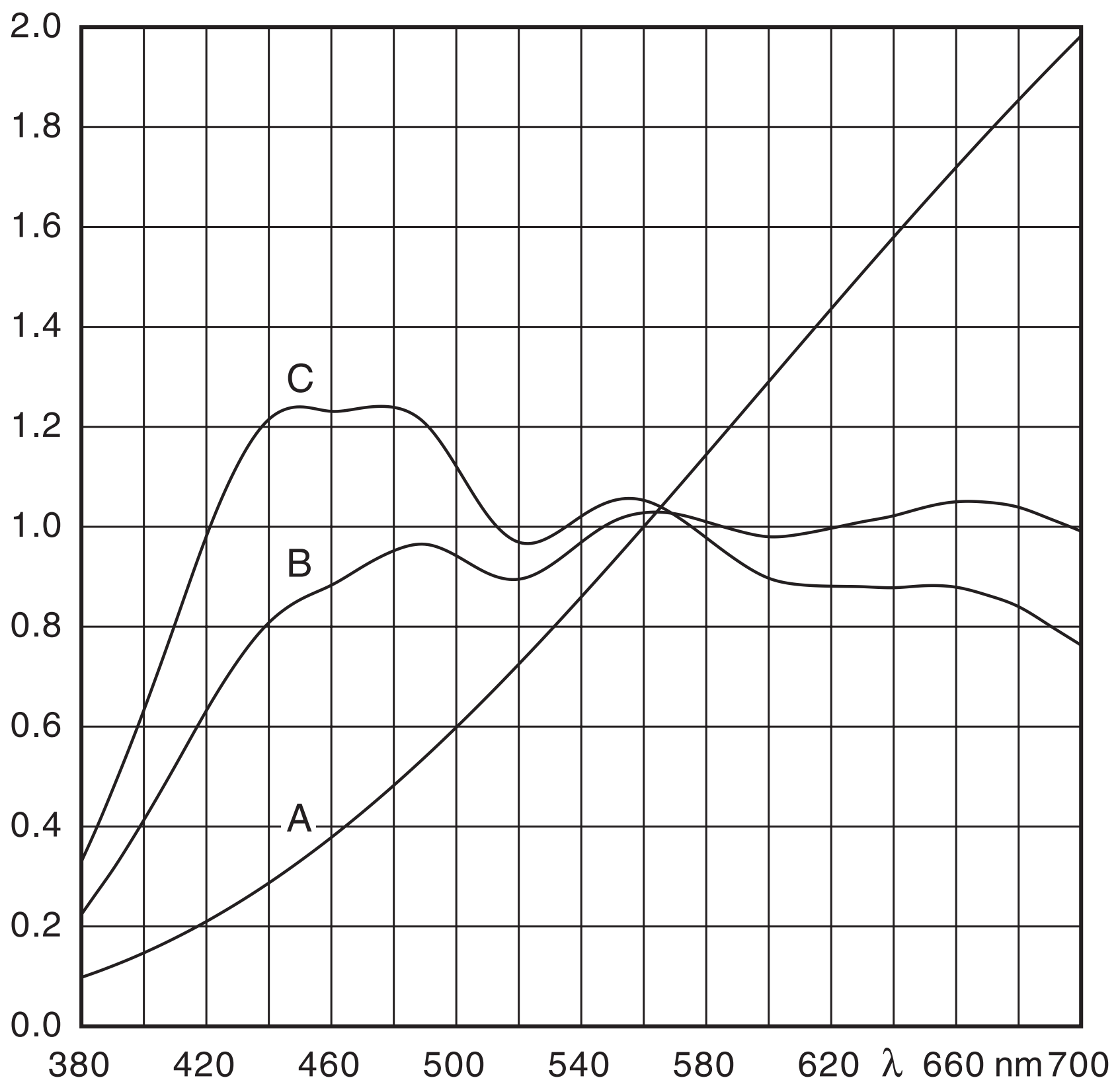
Density

S is the substrate.



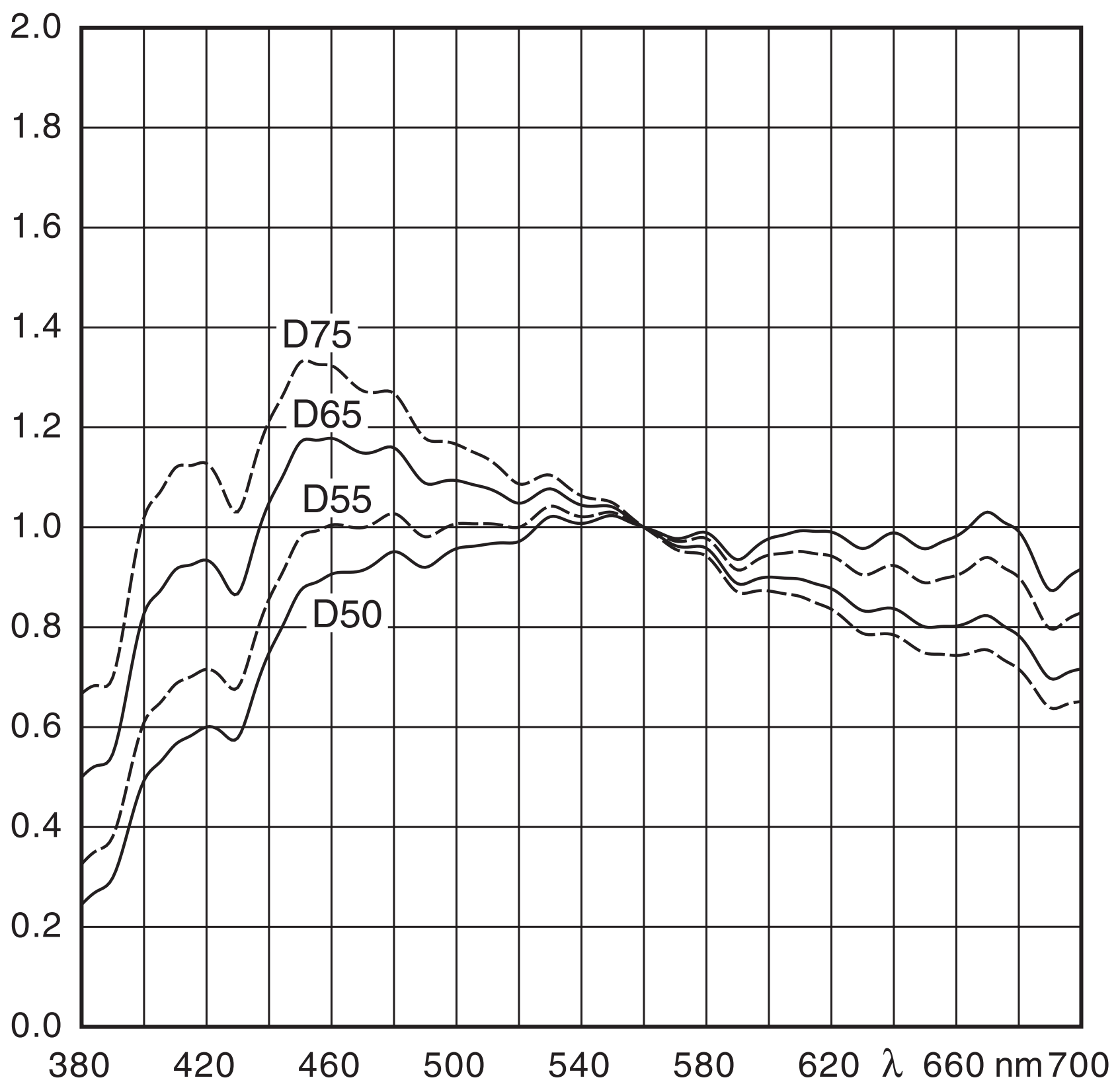
# 15. Daylight ABC

Relative Intensity



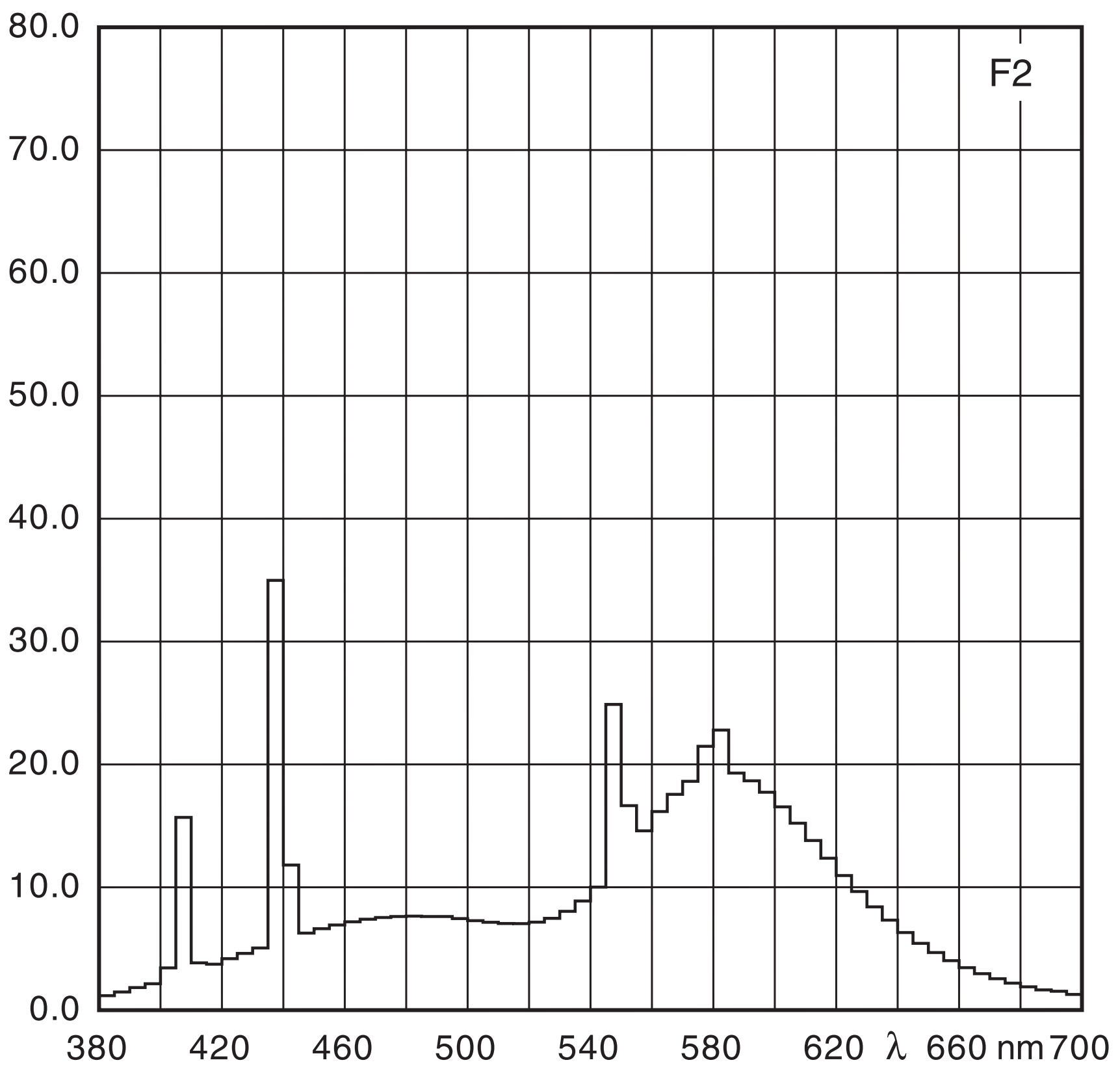
# 16. Daylight Dxx

Relative Intensity



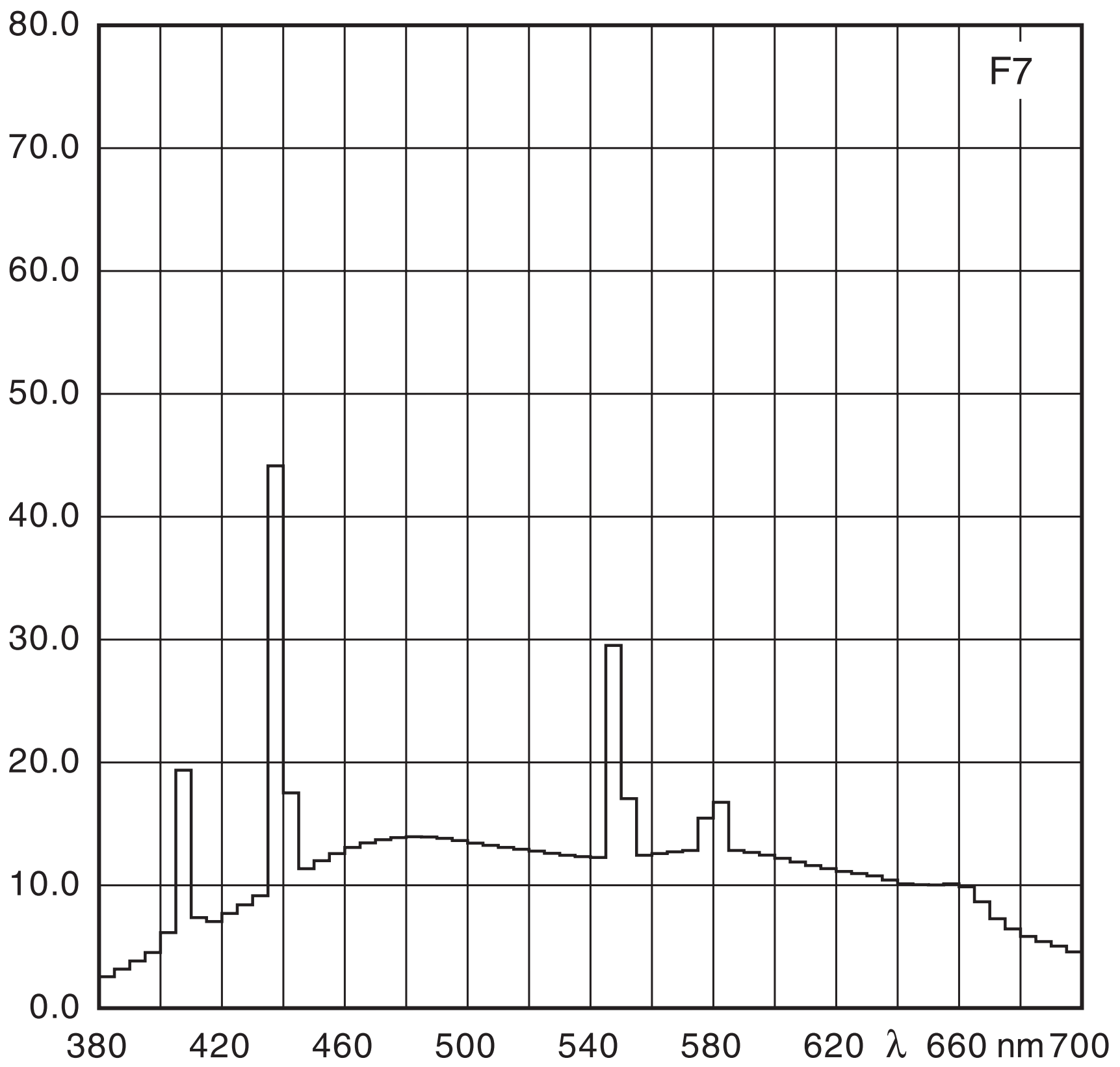
# 17.1 Fluorescent F2

Relative Intensity  
Normal type



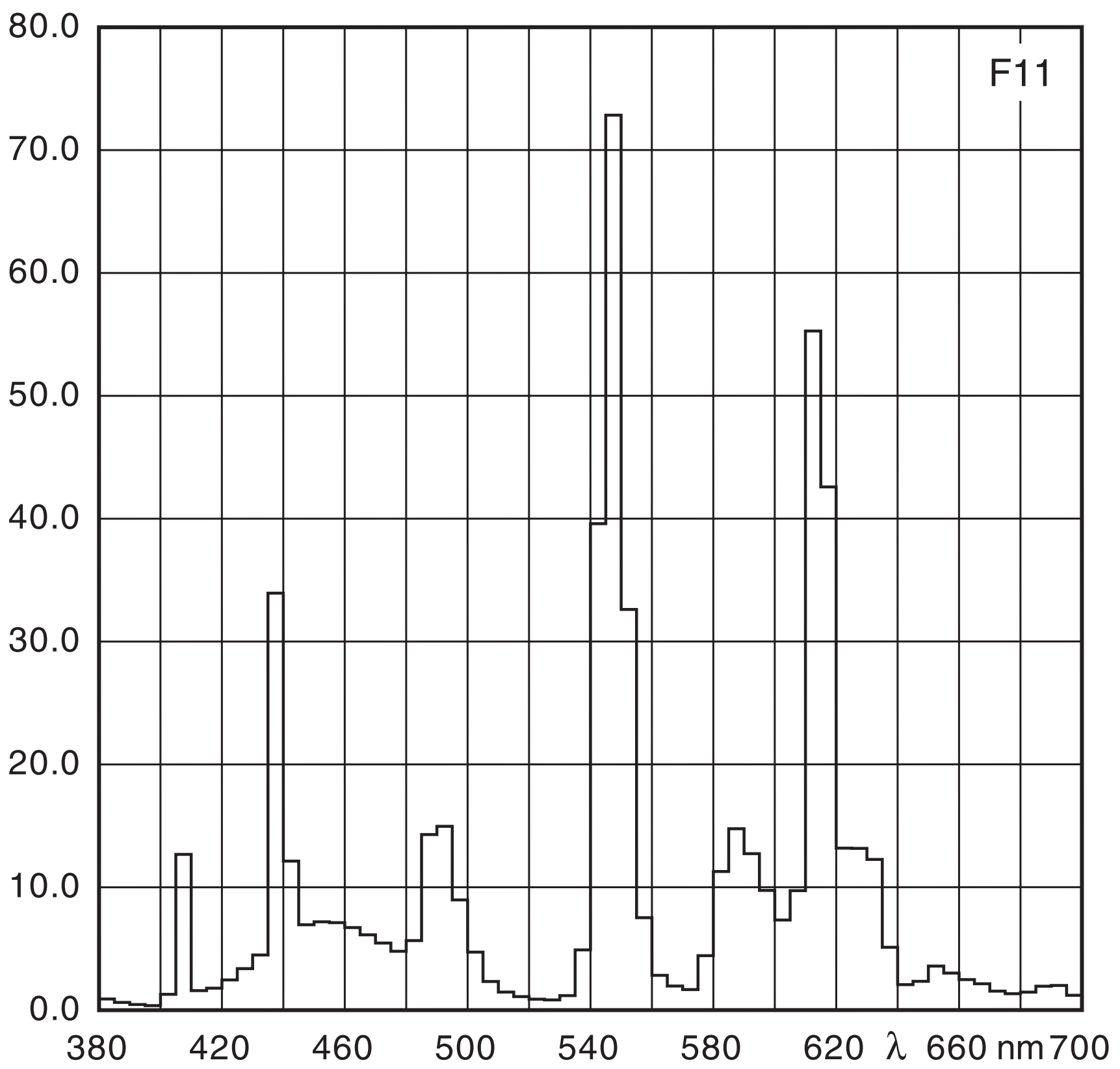
# 17.2 Fluorescent F7

Relative Intensity  
Broad-band type



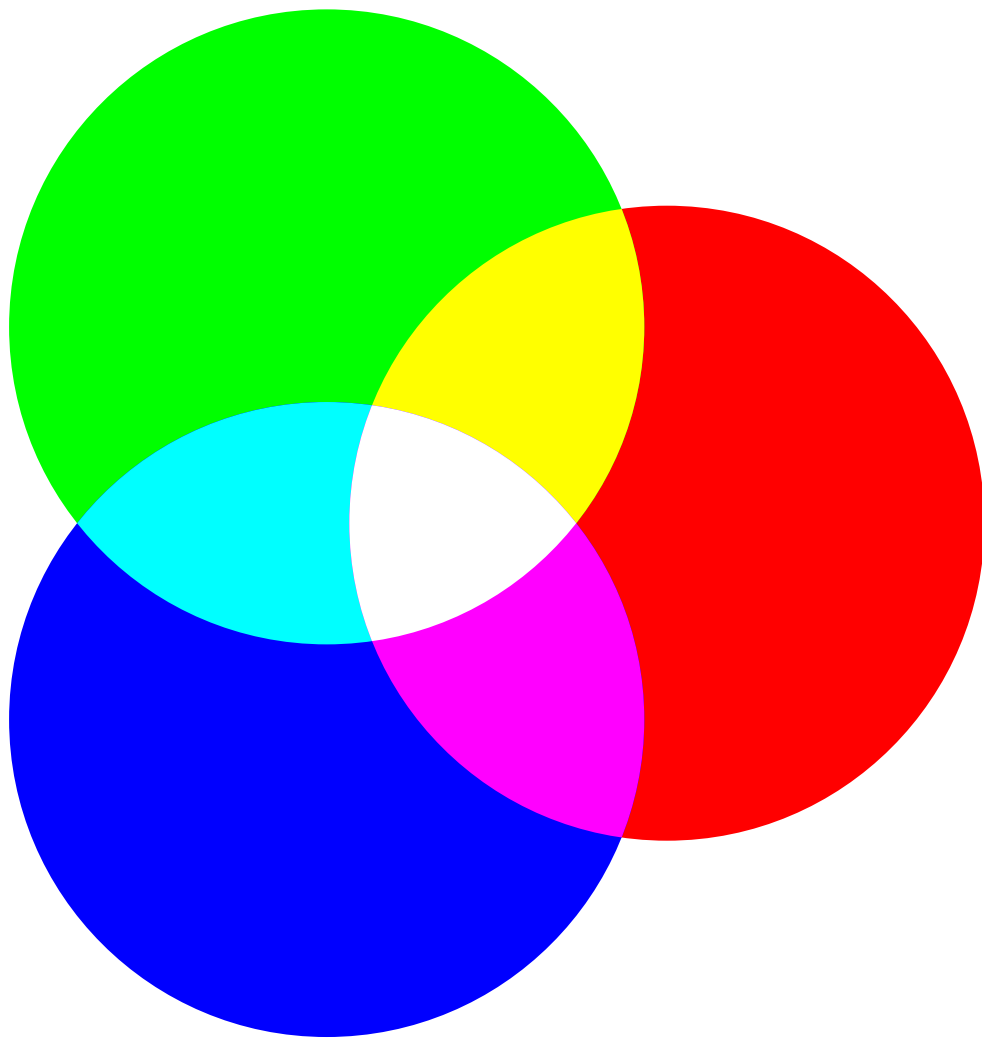
# 17.3 Fluorescent F11

Relative Intensity  
Three-band type

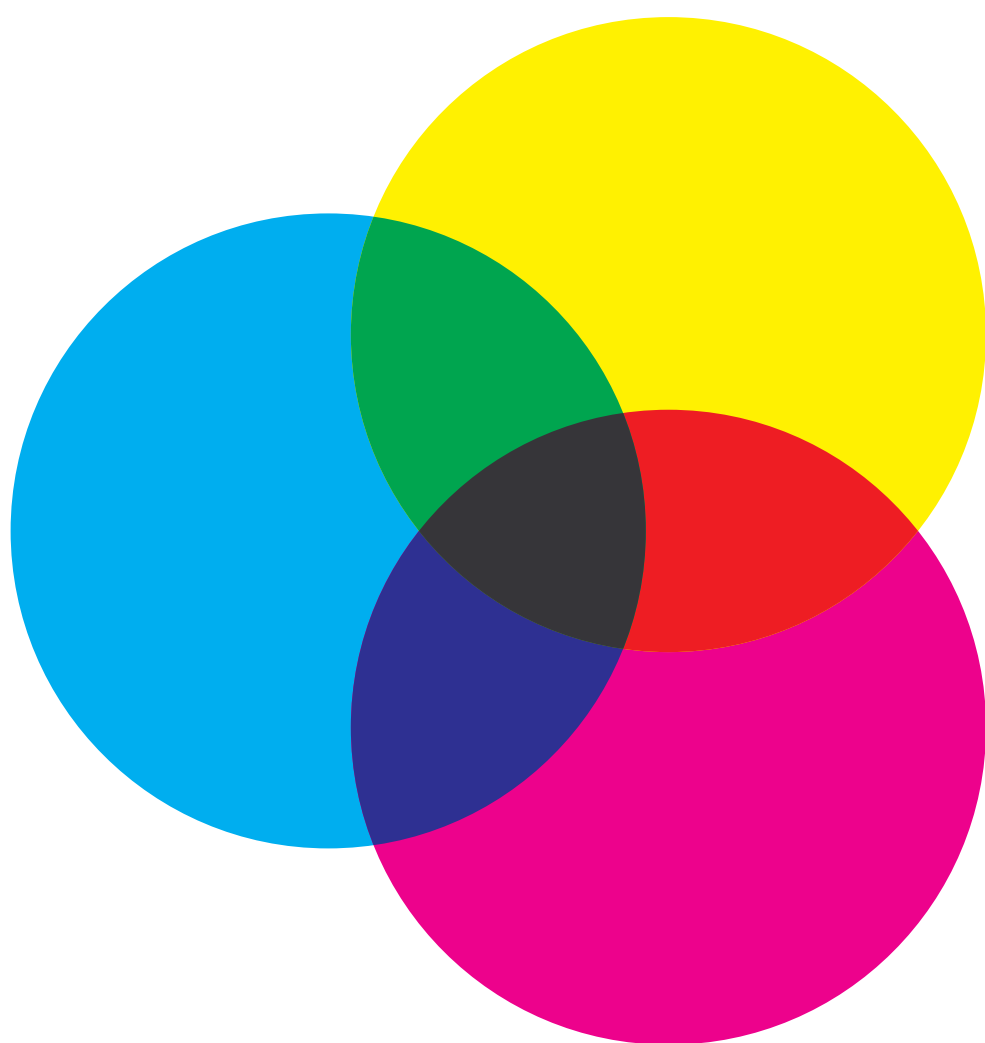


## 18.1 Additive versus Subtractive

Standard textbook illustration - RGB is additive [20]



Standard textbook illustration - CMY is subtractive [21]



## 19.1 Files

1. Color Wheel  
<http://www.fho-emden.de/~hoffmann/colorwheel.txt>
2. Color-Matching Function RGB  
<http://www.fho-emden.de/~hoffmann/matchrgb.txt>
3. Color-Matching Function XYZ  
<http://www.fho-emden.de/~hoffmann/matchxyz.txt>
4. Cone Response  
<http://www.fho-emden.de/~hoffmann/coneresp.txt>
5. Chromaticity Diagram with Color Temperatures  
<http://www.fho-emden.de/~hoffmann/ciesuper.txt>
6. Chromaticity Diagram with Gamut Triangles  
<http://www.fho-emden.de/~hoffmann/ciegamut.txt>
7. Chromaticity Diagram Lu'v'  
<http://www.fho-emden.de/~hoffmann/cieuv.txt>
8. CIE Lab Gamut Volume for sRGB  
<http://www.fho-emden.de/~hoffmann/labbody.txt>
9. CIE Lab Wireframe for CIE-RGB / NTSC / RGB  
<http://www.fho-emden.de/~hoffmann/labwire.txt>
10. CIE Lab and sRGB Numbers  
<http://www.fho-emden.de/~hoffmann/cielab709-50num.txt>
11. Reflectance Ink Spectra ISO 2846-1 / 45°  
<http://www.fho-emden.de/~hoffmann/spectrum45.txt>
12. Reflectance Ink Spectra ISO 2846-1 / 08°  
<http://www.fho-emden.de/~hoffmann/spectrum08.txt>
13. Density Ink Spectra ISO 2846-1 / 45°  
<http://www.fho-emden.de/~hoffmann/density45.txt>
14. Density Ink Spectra ISO 2846-1 / 08°  
<http://www.fho-emden.de/~hoffmann/density08.txt>
15. Daylight ABC  
<http://www.fho-emden.de/~hoffmann/daylightabc.txt>
16. Daylight Dxx  
<http://www.fho-emden.de/~hoffmann/daylightdxx.txt>
17. Fluorescent F2  
<http://www.fho-emden.de/~hoffmann/fluorescf02.txt>
18. Fluorescent F7  
<http://www.fho-emden.de/~hoffmann/fluorescf07.txt>
19. Fluorescent F11  
<http://www.fho-emden.de/~hoffmann/fluorescf11.txt>

## 19.2 Files

20. Three overlapping circles (RGB)  
<http://www.fho-emden.de/~hoffmann/rgb-circle.txt>
21. Three overlapping circles (CMY)  
<http://www.fho-emden.de/~hoffmann/cmy-circle.txt>

Save as \*.txt and rename as \*.eps

## 20. References

- [1] R.W.G.Hunt  
Measuring Colour  
Fountain Press England 1998
- [2] G.Wyszecki + W.S.Stiles  
Color Science  
John Wiley & Sons, Inc  
New York ... Toronto 1982 / 2000

This doc:

<http://www.fho-emden.de/~hoffmann/ciegraph17052004.pdf>

Gernot Hoffmann  
June 07 / 2006  
Website  
Load Browser / Click here