



**GRACoL**  
General Requirements for Applications  
in Commercial Offset Lithography



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## GRACoL Committee Best Practices – DRAFT INFO DOC –

### ***M0/M1 – What it Means and Recommended Practices***

There are a number of new instruments coming onto the market which now support additional measurement illumination conditions. These new instruments follow the standard containing measurement illumination information which was updated in ISO 13655-2009: Spectral Measurement and Colorimetric Computation for Graphic Arts Images. The primary differences are that the new M standards such as M1 specify a defined amount of UV energy, and most are now using a different illuminant. Many new instruments can measure in both the new modes, as well as the instruments older legacy mode. Here is a brief summary of the new modes:

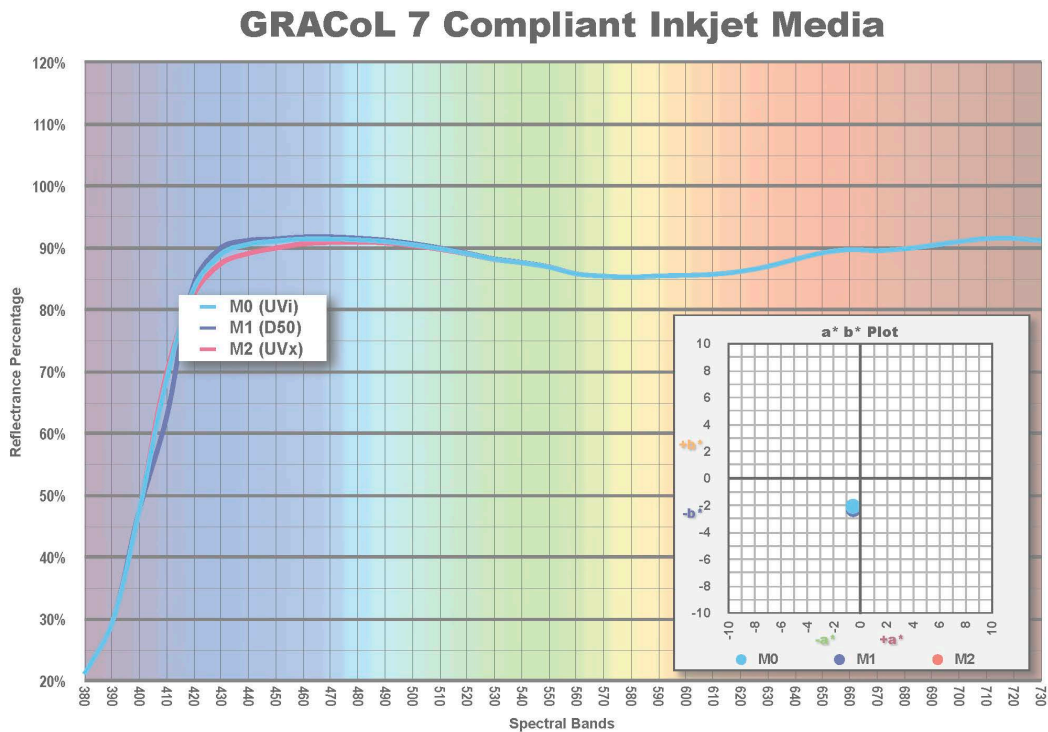
- **M0**: does not define UV energy, and does not completely define the illuminant condition. By definition older and instruments currently in use in the graphic arts are M0. While the UV level of these instruments is typically known, they are not held to any tolerances in manufacture, and all levels of UV are considered within specs for M0
- **M1**: contains UV energy for use with brightened stocks. As such it is a sub set of M0.
- **M2**: contains a specification for UV cut or UV filtered illuminant condition.
- **M3**: contains a specification for UV cut or UV filtered illuminant condition as well as for polarization.

The new M standards mean you now need to know which measurement standard to use when measuring. The M1 measurement standard offers great promise for issues we encounter with optically brightened stocks. At this time many current workflows do not yet support the use of M1, and current GRACoL characterization data are based on M0 measurements. (M0 and M1 measurements should be similar on non-brightened stock, but may be considerably different on brightened stocks.) Here are some recommendations for deciding which measurement standard to use:

- M0 should be considered the default condition.
- Unless all members of your workflow can measure and so support the use of M1 you should continue to use M0. You may avoid issues by using non-brightened stock or by compensating for brighteners by using UV filtered measurements.
- Current GRACoL characterization data is based on M0 measurements. For use matching GRACoL characterization data we recommend that you use M0 data at this time.
- If a vendor or workflow has developed a GRACoL compliant workflow using M1 data you may choose to use M1.
- If you are trying to create a GRACoL relative calibration on a brightened stock you may choose to use M1. (Be aware the visual match with non-brightened substrates may vary)

## Graphs of M0, M1, M2

Below are a series of graphs showing M0, M1, and M2 readings on 3 common stocks. The stocks are a GRACoL/ISO 12647 compliant proofing paper, a brightened press sheet, and a photo inkjet paper. You can see in the graphics how the reaction differs depending on the measurement condition and the use of brighteners in the stock.



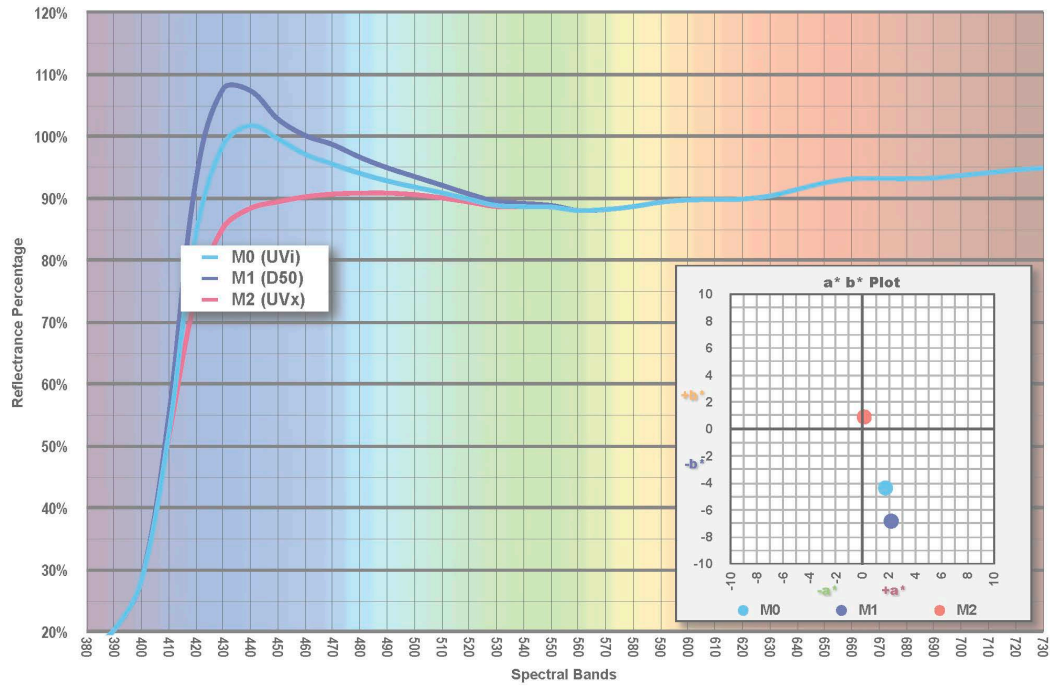
Graphs and Data Prepared by Roy Bohnen and Terry Wyse, August 2012



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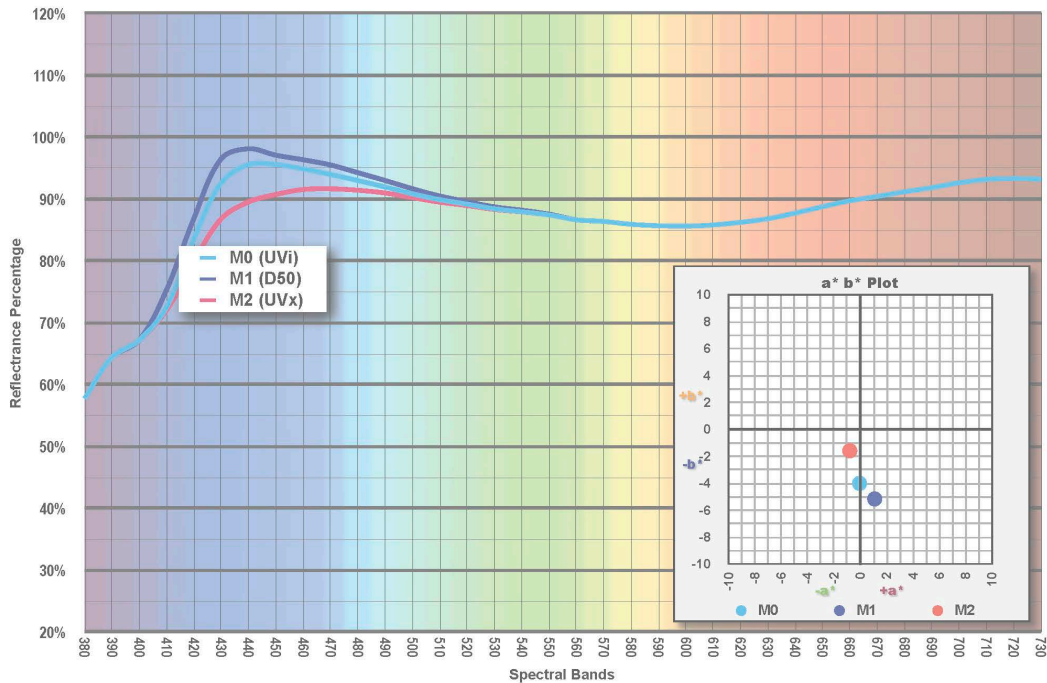


## Press Stock



Graphs and Data Prepared by Roy Bohnen and Terry Wyse, August 2012

## Photo Base Inkjet Media



Graphs and Data Prepared by Roy Bohnen and Terry Wyse, August 2012

A more comprehensive explanation of the M standards has been written by Raymond Cheydleur and Kevin O'Connor and can be found at the following link:

[http://www.xrите.com/documents/literature/en/L7-510\\_M\\_Factor\\_en.pdf](http://www.xrите.com/documents/literature/en/L7-510_M_Factor_en.pdf)

### G7 Master Printer vs. GRACoL or G7 Certified – Correct Terminology

Note that there is no such thing as a 'G7 Certified' or 'GRACoL Certified' printer. The printers receive a certificate *qualifying* their facility as a G7 Master facility.

Printers and print buyers often use the term 'GRACoL Certified' when specifying printing or referring to print facilities. Here is some information on G7 Qualification programs, and what customers can expect based on these qualification programs.

- A G7 Master Printer is a printer who has demonstrated that they can print to G7 Gray on specific equipment in their plant.
- A G7 PC Master Printer is a printer who has demonstrated that they can print to G7 Targeted on specific equipment in their plant. This printer will send in materials 4 times a year to demonstrate compliance.



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- A G7 PC Digital Printer is a printer who has demonstrated that they can print to GRACoL on a specific piece of digital equipment in their plant.
  - A G7 PC Premedia is an organization who has demonstrated they can prepare and proof to a G7 Targeted print condition.

### **Expectations based on G7 Master Status**

While agreements between printers and print buyers vary based on cost, requirements and plant facilities there are some common expectations:

- The printer should be able to print to GRACoL, SWOP or a designated G7 print condition
- Measurement of a production job is not required to match the G7 Pass/Fail Requirements. G7 Pass/Fail tolerances are calibration tolerances and are generally too tight for normal production.
- Unless otherwise agreed upon by the printer and buyer, during live production the printer is given the discretion to match the proof and make adjustments based on paper, print conditions, and visual match.
- In most cases the customer is more concerned with the visual match between a G7 based (GRACoL, SWOP) proof and the final product.