45th International Circle Conference 2013

Understanding the New ISO 13655 Measurement Standard in Press and Proofing Applications

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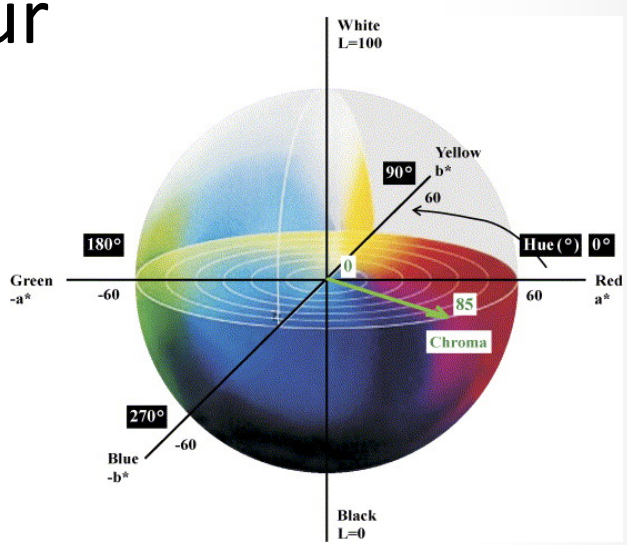
Overview

- Accurate and consistent colour
  - Optical Brightening Agents (OBAs) and Ultra Violet (UV)
  - Measuring Reflectance
  - ISO 13655 and M0, M1, M2, M3
    - **Is it a suitable alternative to what we are using now?**
- Experimental Details
- Results
- Conclusions and final thoughts

Importance of Accurate and Consistent Colour

Main considerations: Ability to deliver consistent colour

- To match customer expectations
- Uses "printing to the numbers"
- Usually CIELAB characterization data values



Problem of OBAs and UV

- UV component varies
  - Measuring instrument
  - Viewing booth
  - Actual viewing conditions
- When UV components not well defined
  - Inter-instrument differences
  - Colour correlation between measurement and viewing booth
  - Colour correlation between viewing booth and final actual viewing conditions

Measuring Reflectance

- Instrument can have different light sources
- Similar measurement results between devices because of % reflectance
  - Illuminate with 40% and having 20% being reflected back results in a 50% reflectance at this wavelength
  - Colour description independent of illuminant

Effect of OBAs and UV

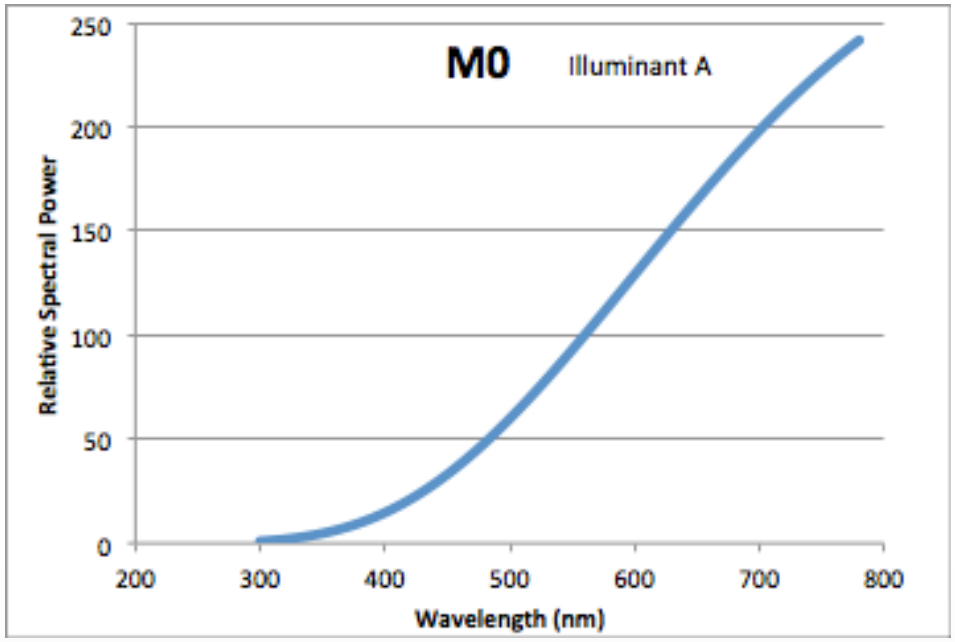
- Measured spectrum becomes dependent on the instrument's illuminant
- UV from the measuring light absorbed and emitted in blue part of spectrum
  - % reflectance will change with the amount of UV in device
- In order to maintain accurate and consistent colour measurements, illuminant UV characteristics must be specified

ISO 13655 and M0, M1, M2, M3

- Published in 1996 and revised in 2009
  - ISO 13655:2009 –Graphic technology — Spectral measurement and colorimetric computation for graphic arts images
- New revision provides more clarity illuminant and measurement modes
- Defines four measurement modes - M0, M1, M2 and M3

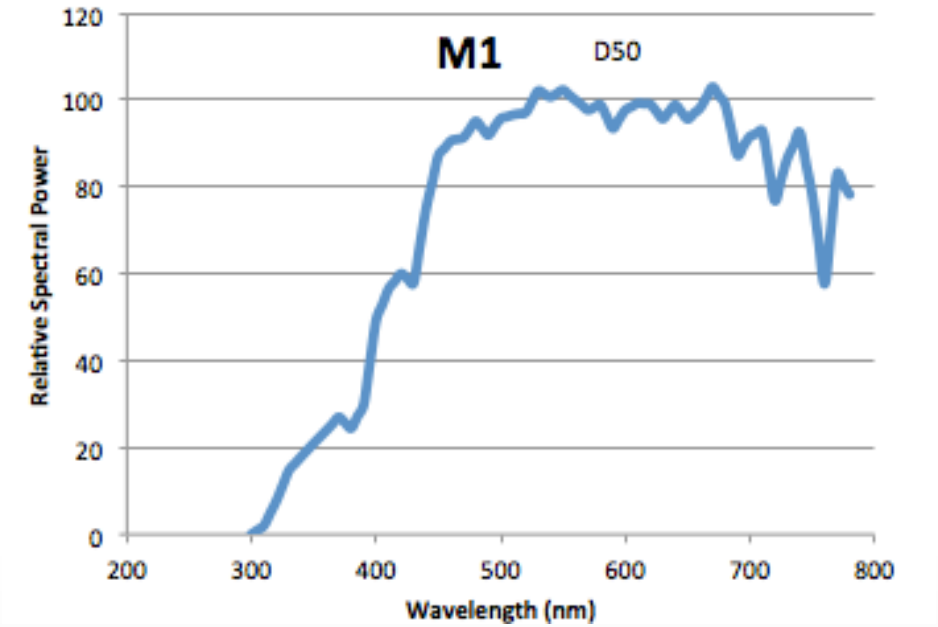
ISO 13655 and M0, M1, M2, M3

- M0 – legacy mode (based on Illuminant A - tungsten bulb found in older devices)



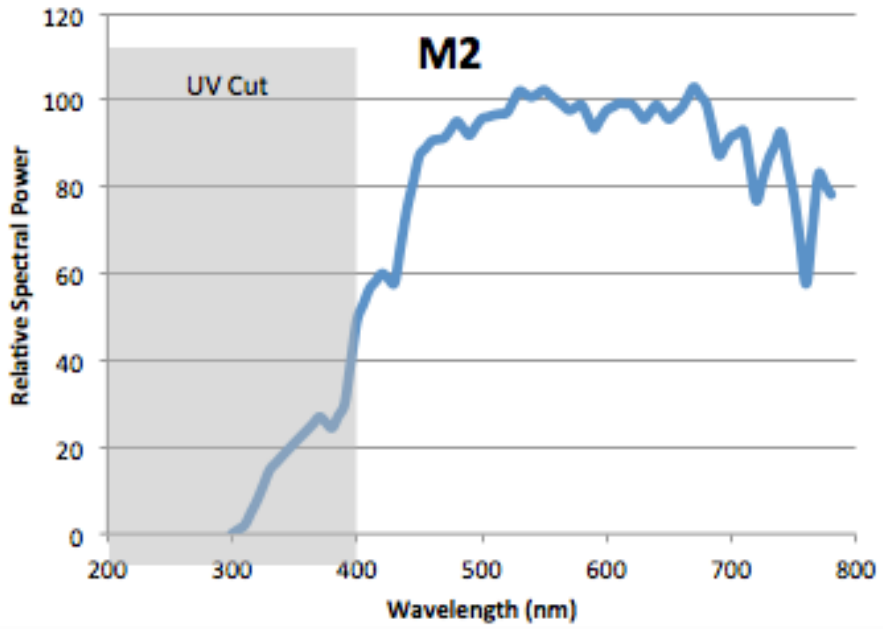
ISO 13655 and M0, M1, M2, M3

- M1 – D50 mode



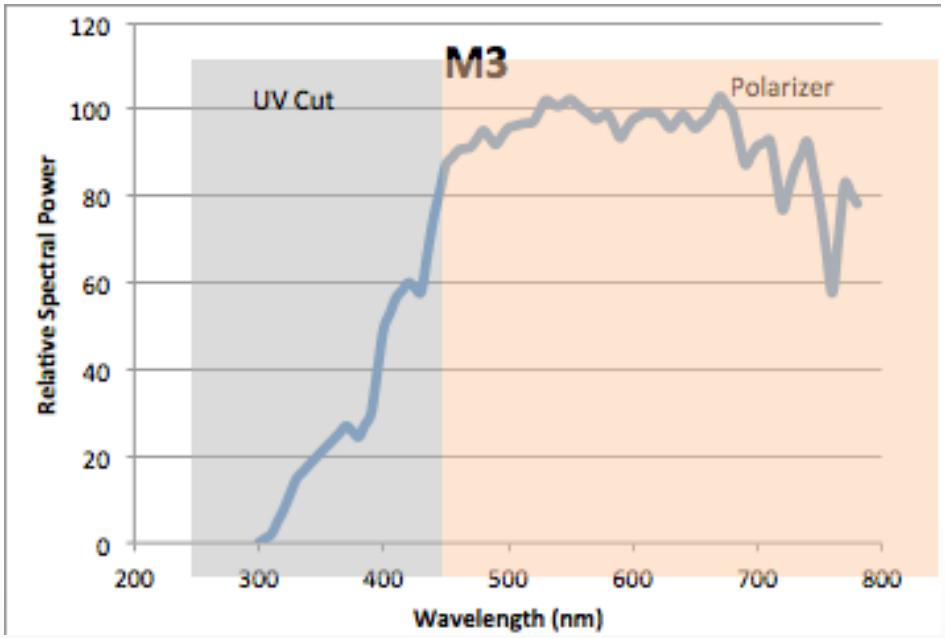
ISO 13655 and M0, M1, M2, M3

- M2 – UV-cut mode

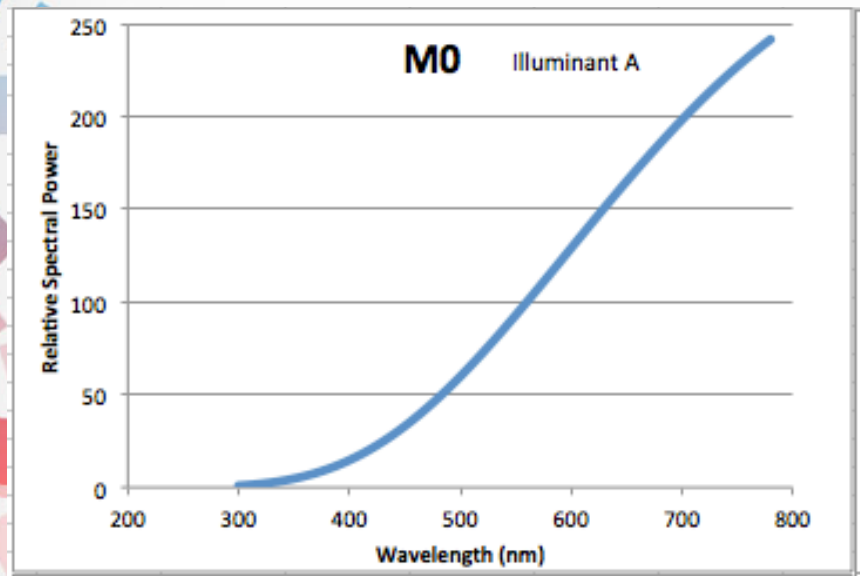


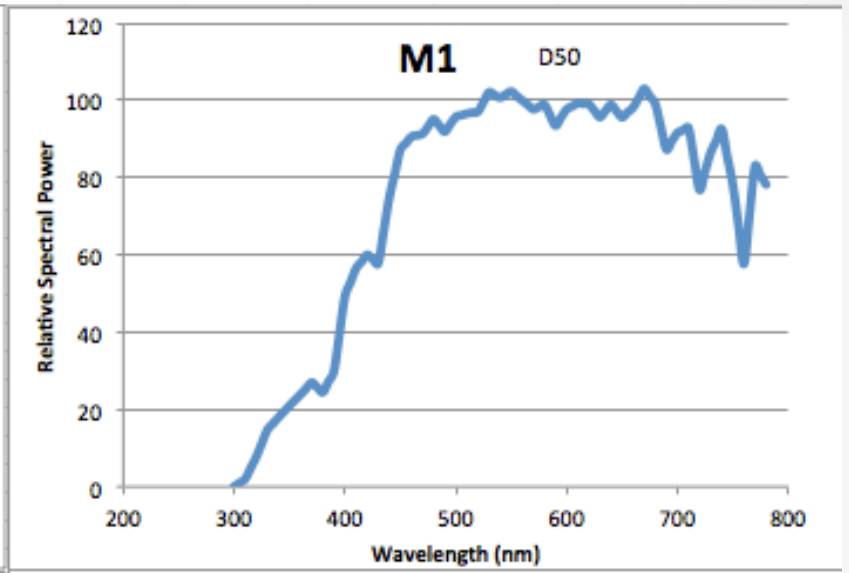
ISO 13655 and M0, M1, M2, M3

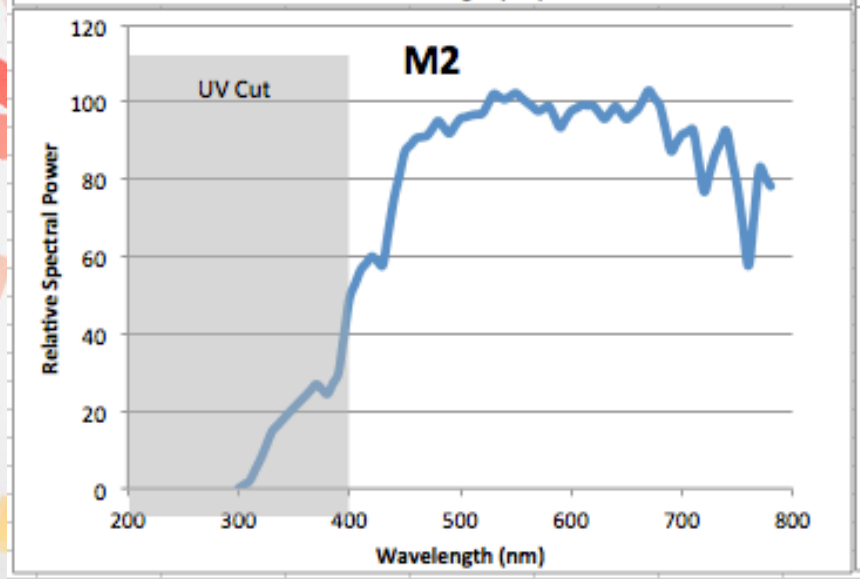
- M3 – polarizing mode (for measurement of wet offset press sheets)

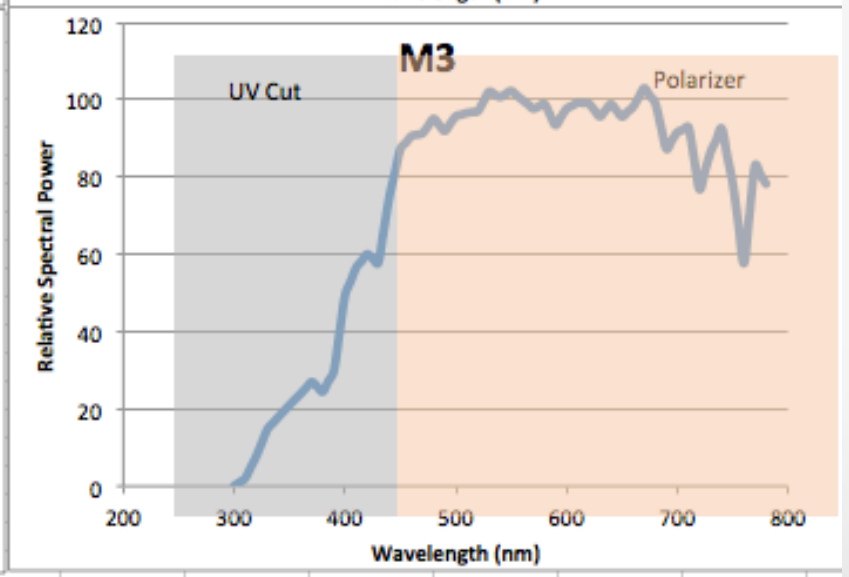


ISO 13655 and M0, M1, M2, M3









Experimental Details

- Experiment compared effects of measuring samples with modes M0, M1, M2 and M3
- Device: Konica-Minolta FD-7 and X-Rite i1iSis spectrophotometer
- Samples: six different types of paper
  - Four with OBAs
  - Two without OBAs

Experimental Details

- Offset press run was conducted to measure dry-back of ink density for offset inks
- Materials:
  - 100M Condat Supreme Gloss Text (coated)
  - 70M Williamsburg Offset Smooth (uncoated)
  - Hostmann Steinberg Perfexia (PX-V) CMYK process inks
- Press: Ryerson University's 4-colour Heidelberg PM74 press
- Device: Konica-Minolta FD-7 and X-Rite 530 spectrophotometer

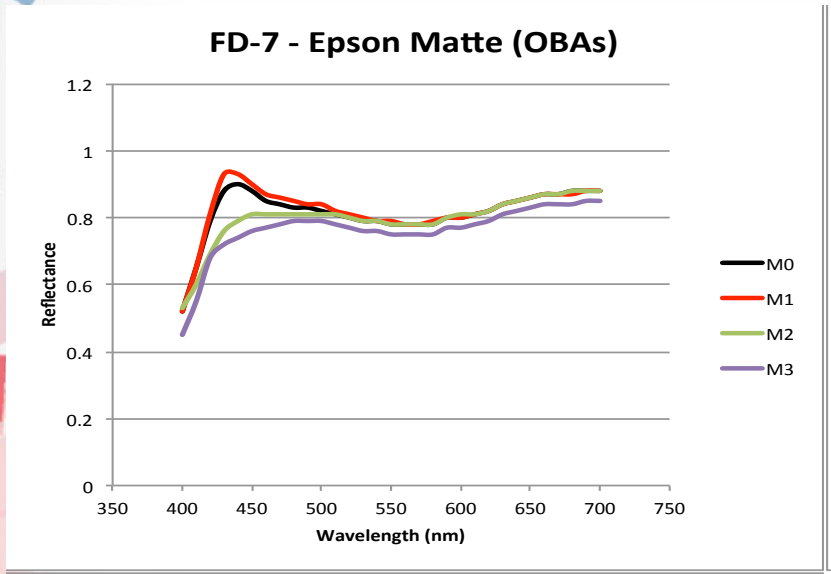
Experimental Details

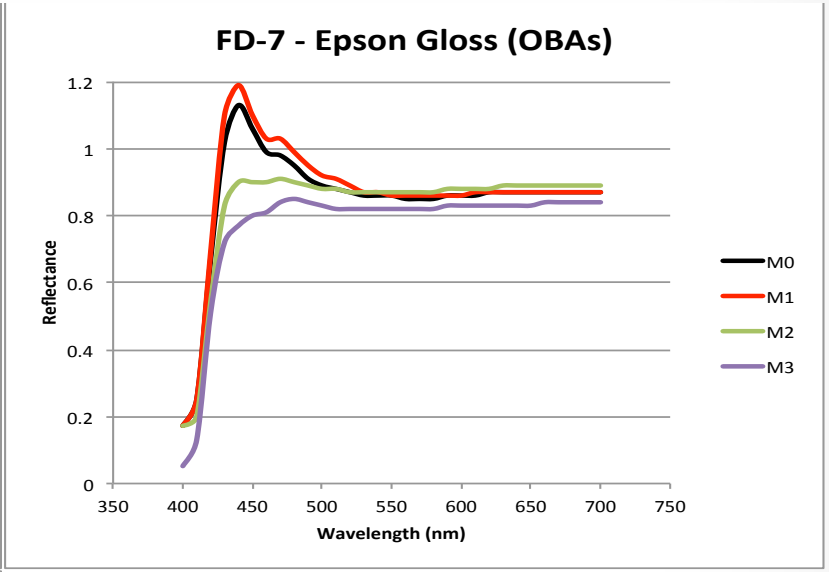
- Three different instruments were used in a number of different configurations as summarized below

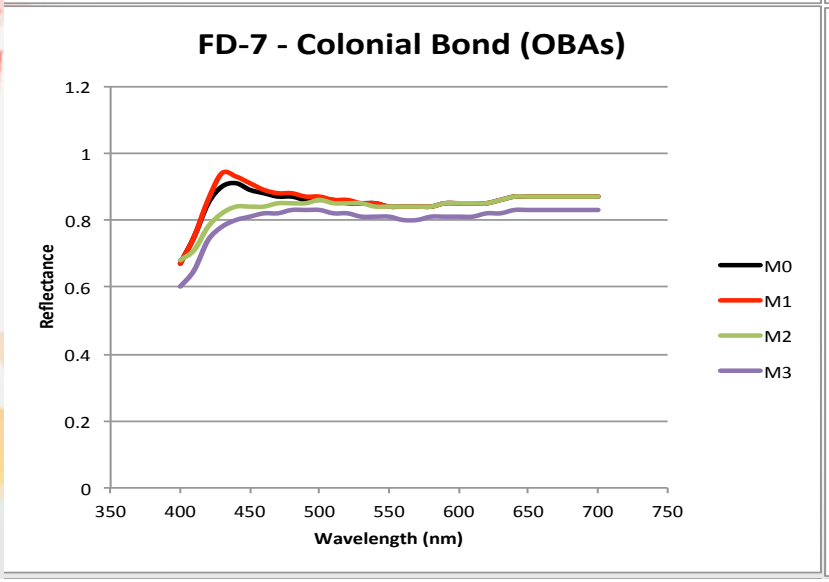
Konica-Minolta FD-7	X-Rite i1iSisXL	X-Rite 530
M0 - Spectral data	M0 - Spectral data	M0 - Density
M1 - Spectral data	-	-
M2 - Spectral data	M2- Spectral data	-
M3 - Spectral data and density	-	-

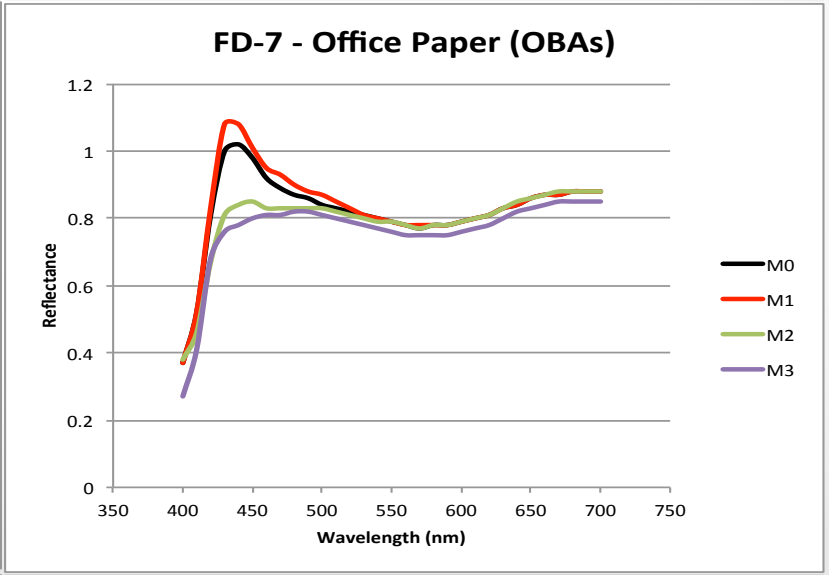
Results

- Data from Konica-Minolta FD-7 Spectrophotometer









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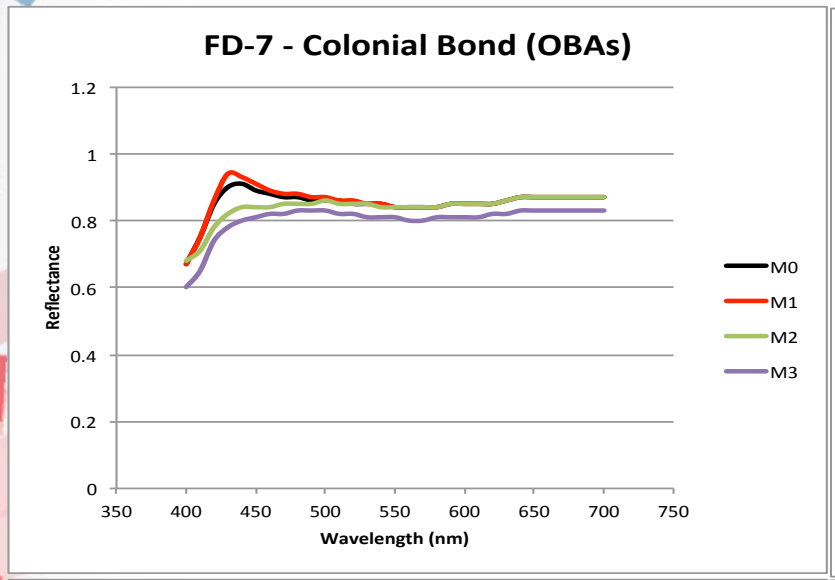
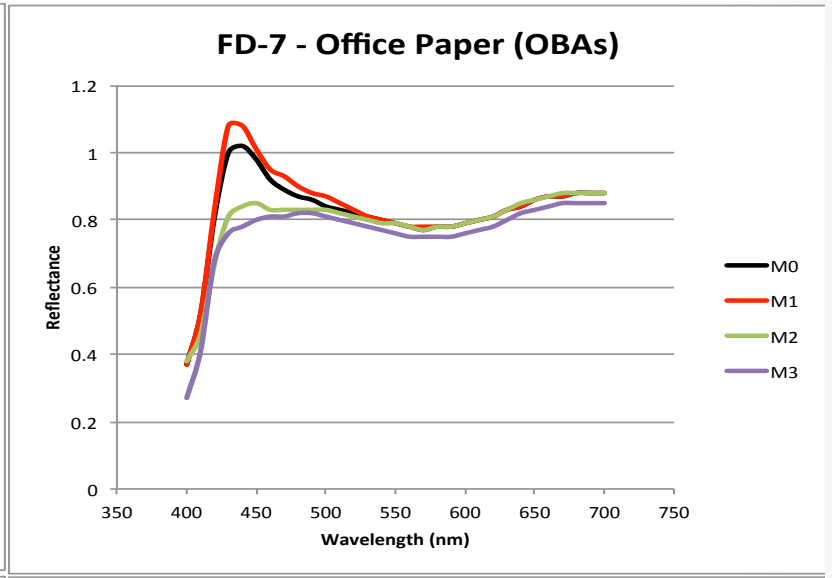
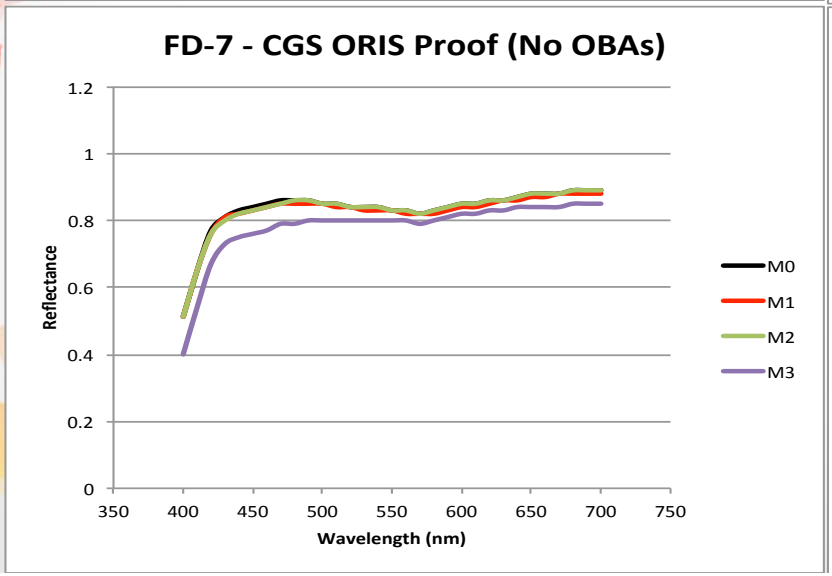
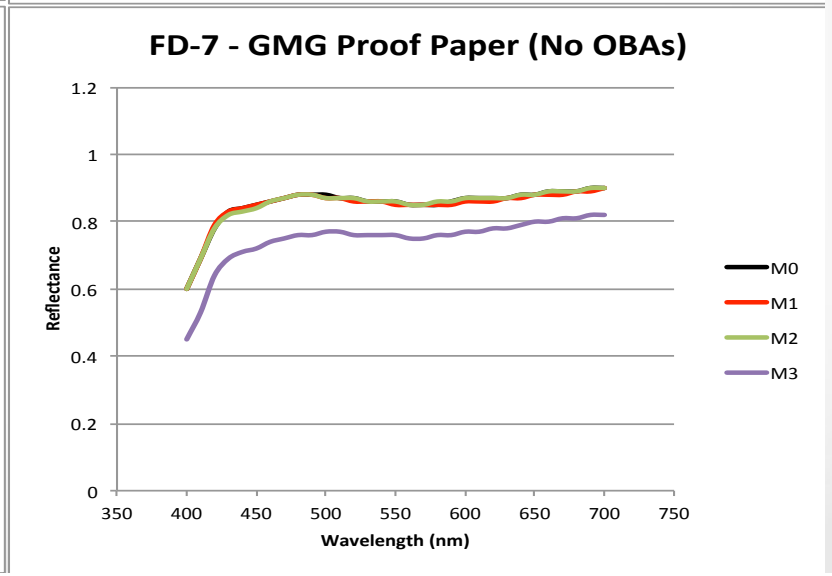


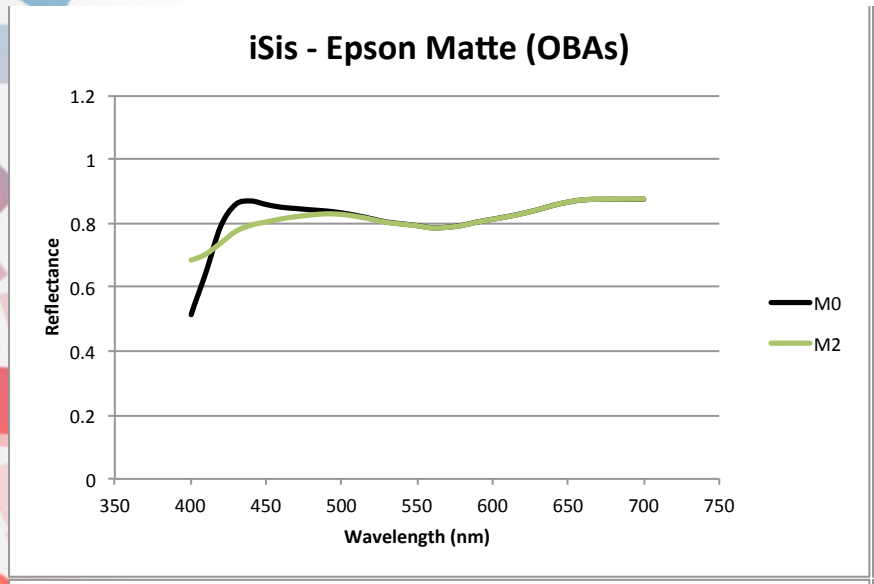


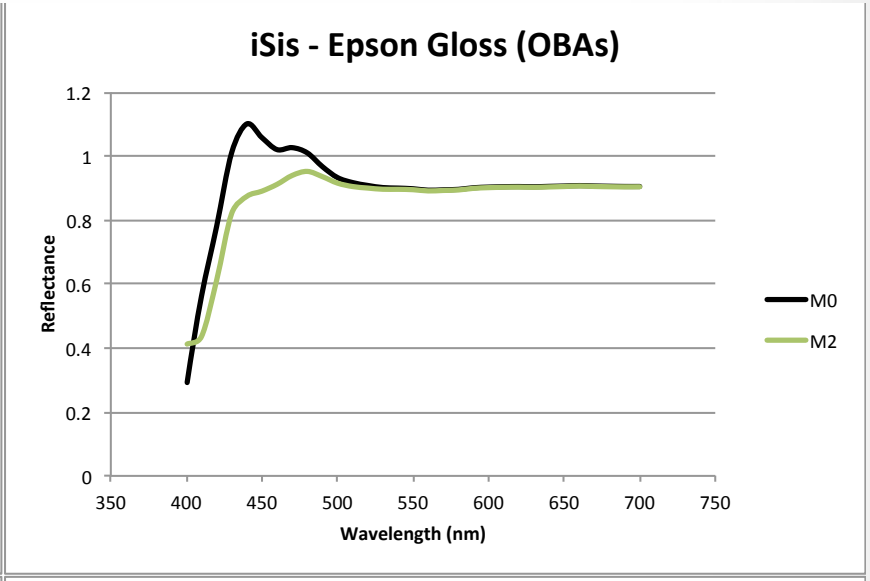


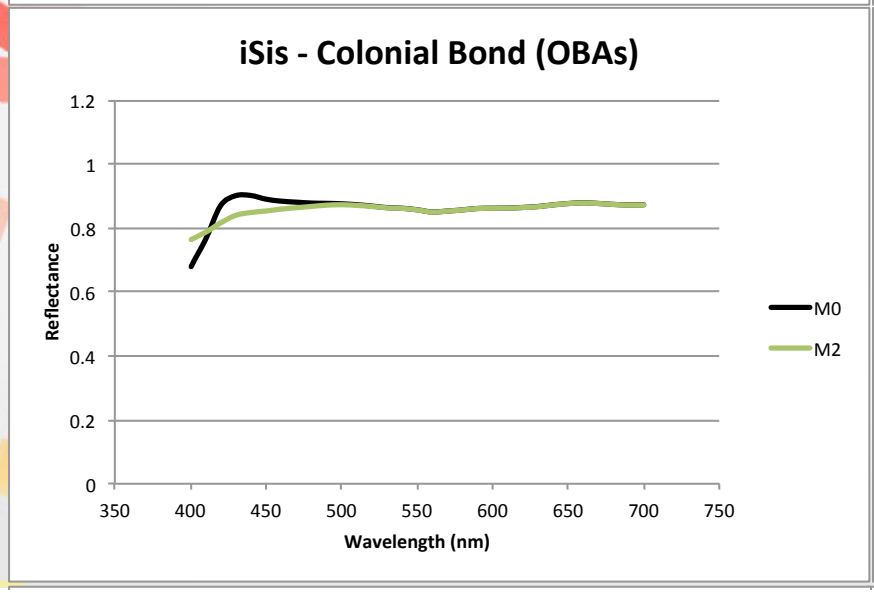


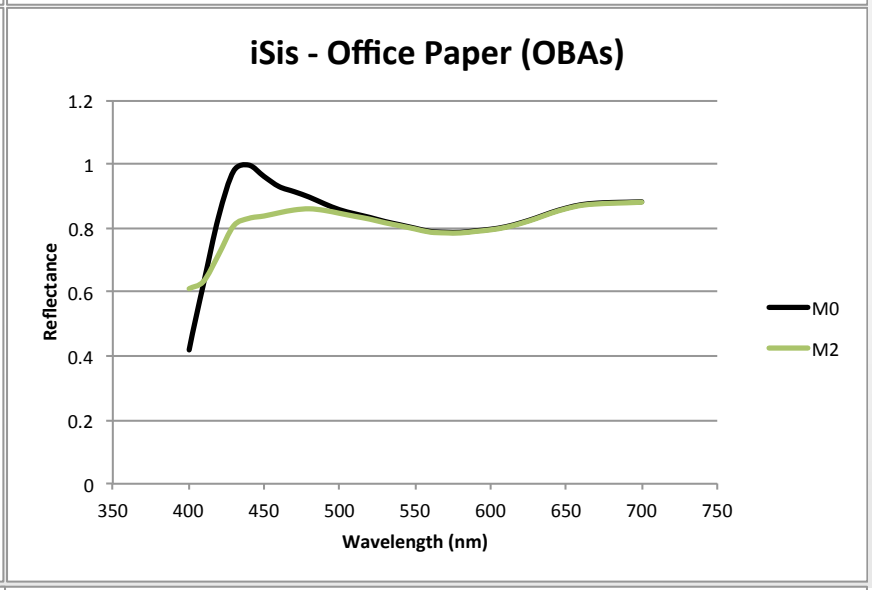
Results

- Data from X-Rite i1iSisXL Spectrophotometer



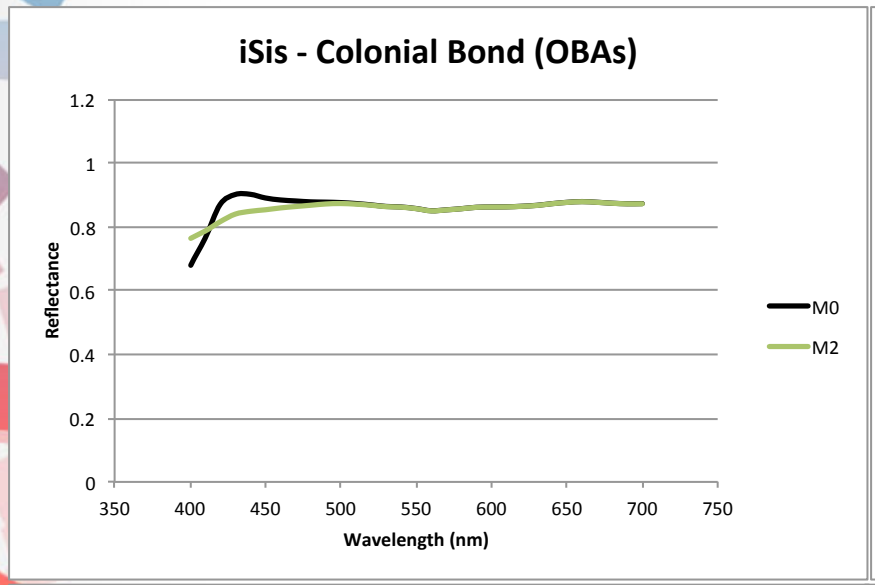


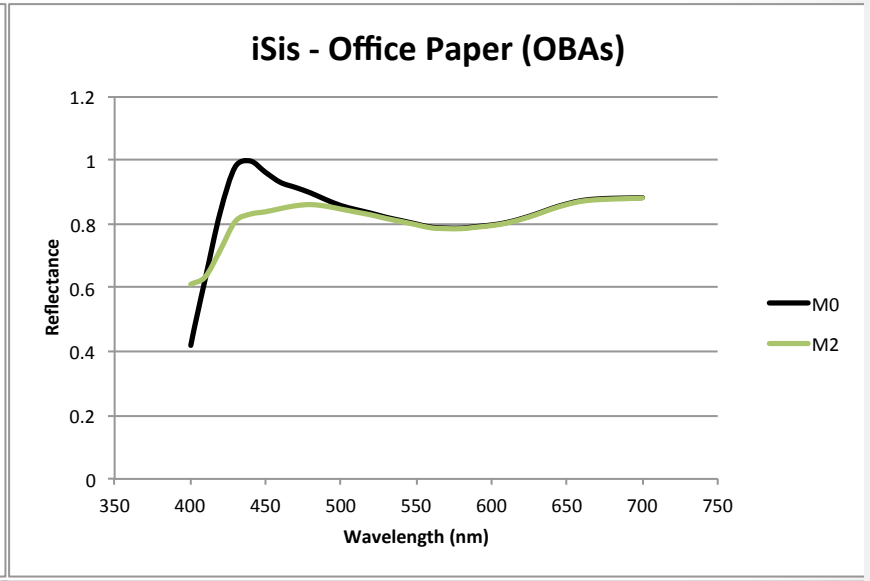


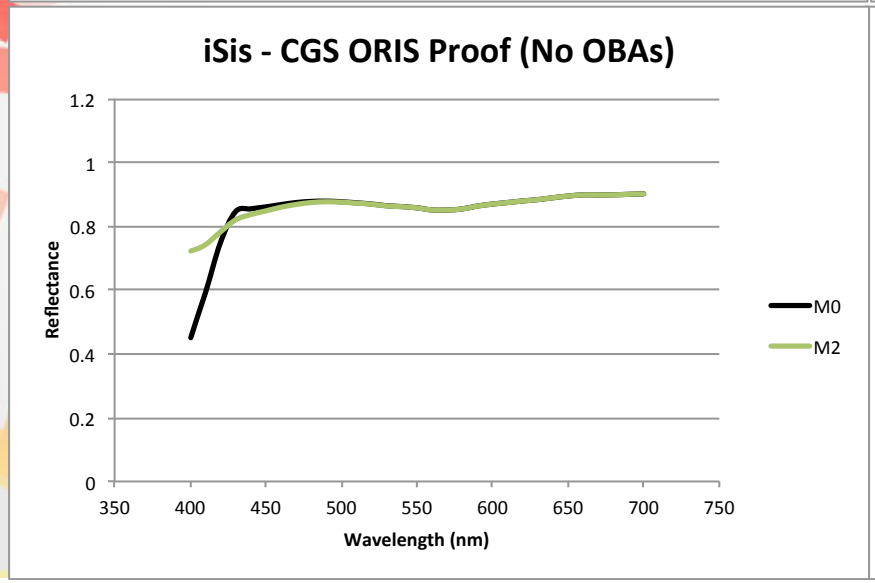


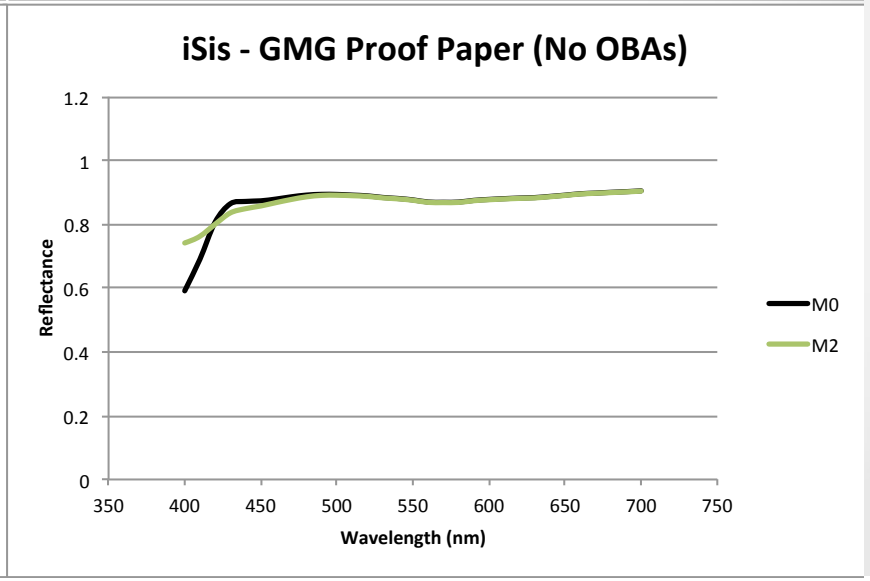
Results

- Data from X-Rite i1iSisXL Spectrophotometer



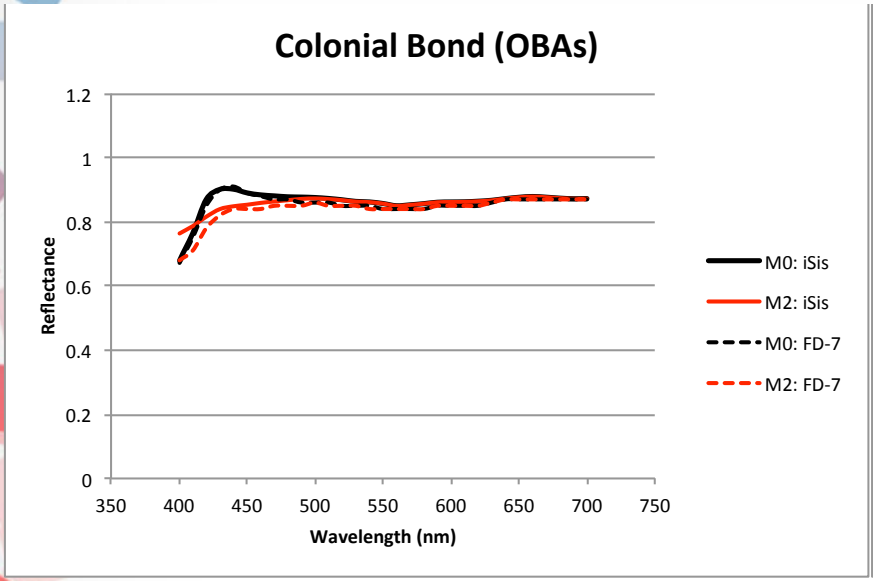


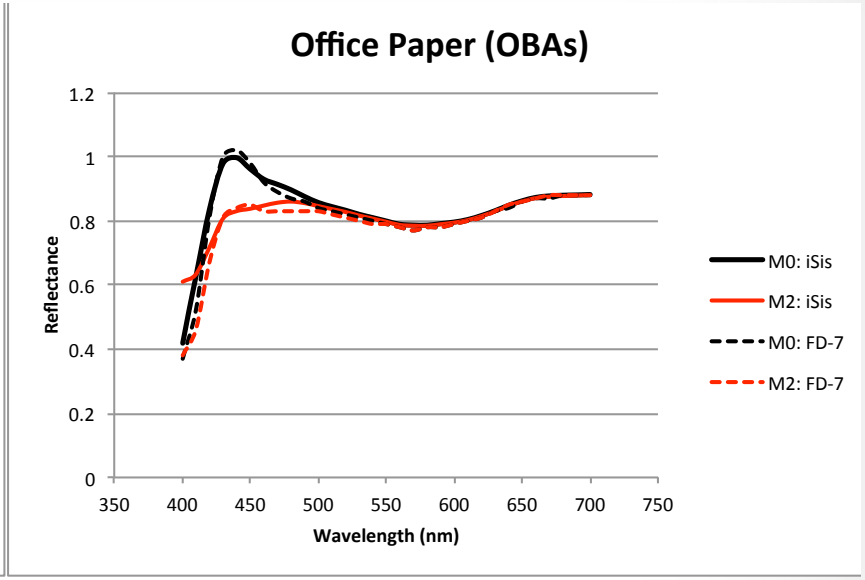


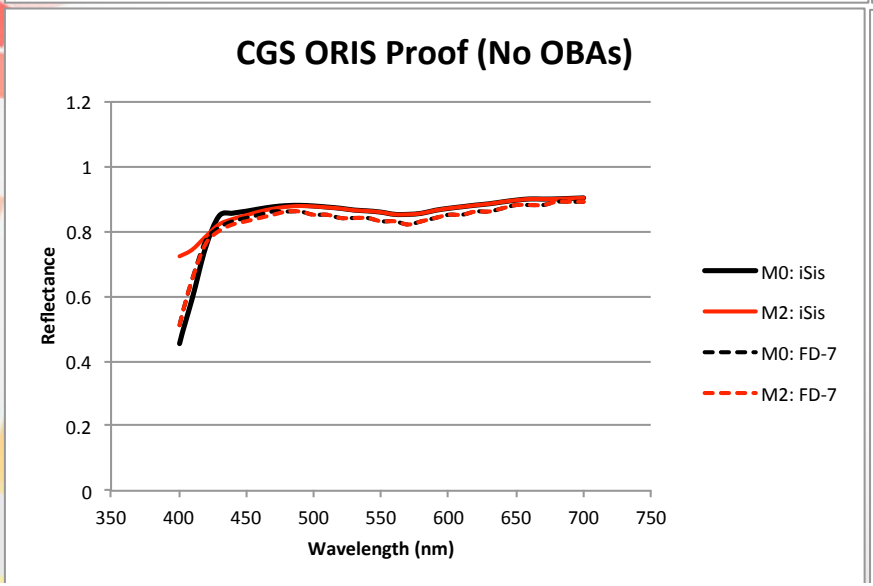


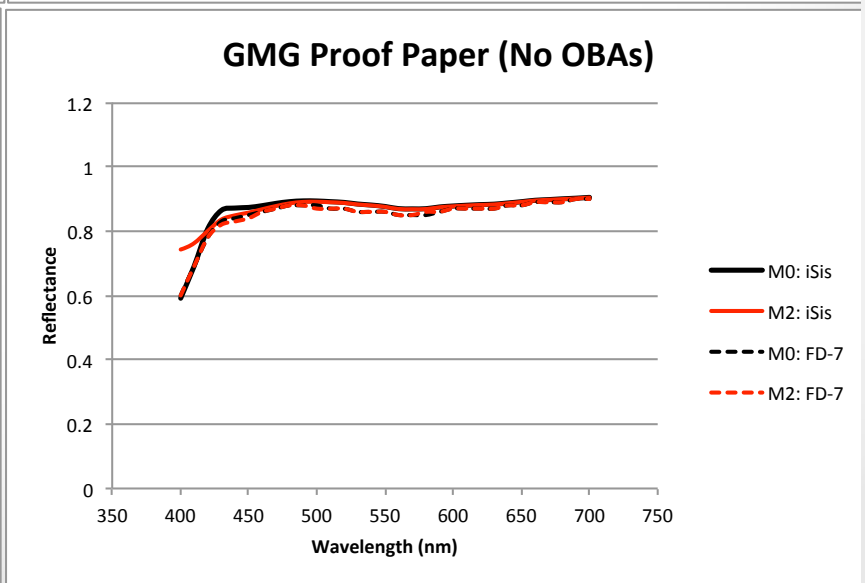
Results

- Comparing Konica-Minolta FD-7 and X-Rite i1iSisXL



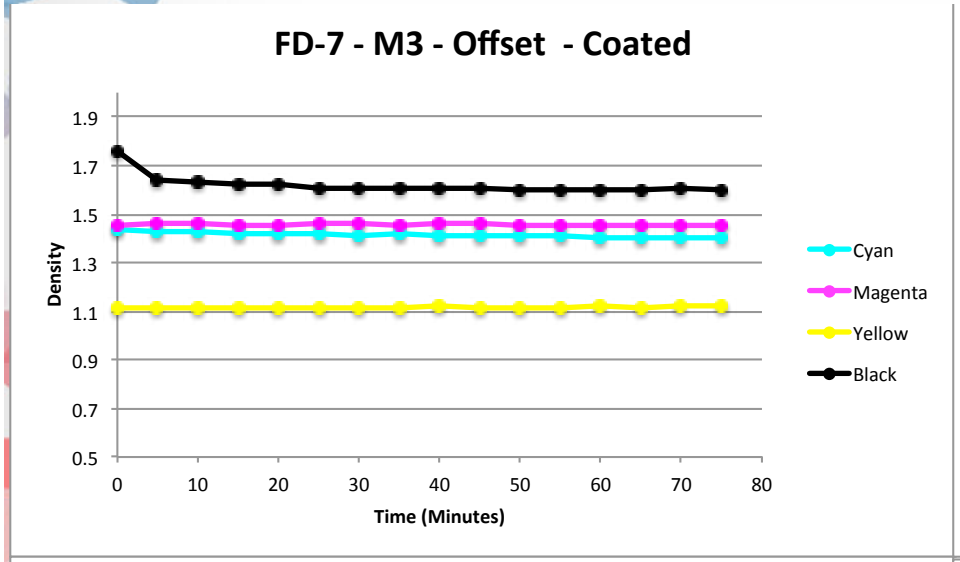


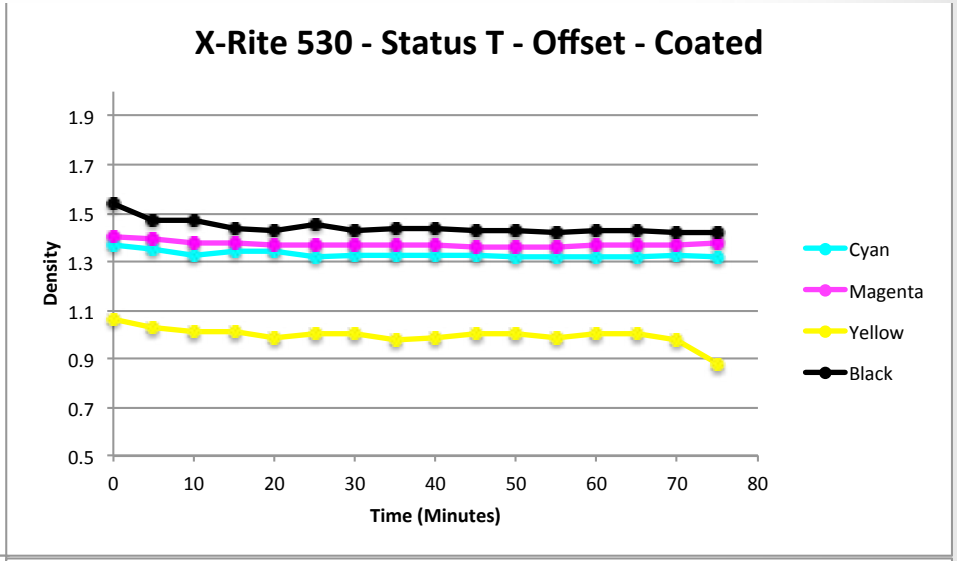


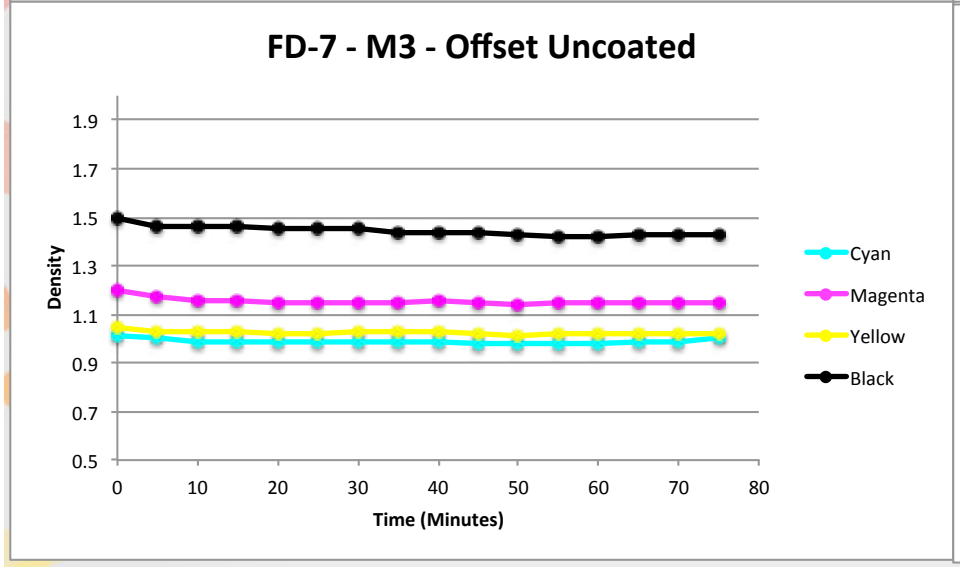


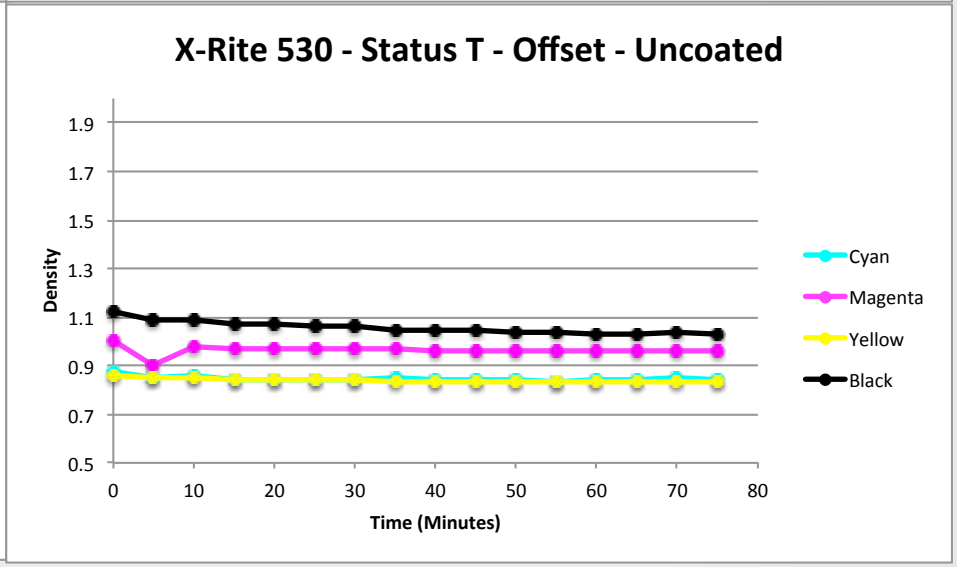
Results

- Density change with ink dry back for offset printing









Conclusion

- M0 can continue to be used
- Papers containing OBAs clearly showed a peak in the blue part of the measured spectrum
- If a sample contained no OBAs then measurement in M1 (UV included) and M2 (UV excluded) created the same response
- M3 is a polarization mode will often result in a "darker" density

Conclusion

- The new ISO 13655 standard for instruments and ISO 3664 standard for viewing booths will greatly reduce the colour matching problems currently faced in the field.

- We appeal to the instrument manufacturers to upgrade or update their instrument portfolio to align with ISO 13655.

Thank you!

Erin Luu and Abhay Sharma
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