Application note | New polarization filter in SpectroEye

Revision C SpectroEye instruments or later, as noted on the type label, are equipped with a new polarization filter. The instruments are also marked with a star following the part number (e.g. Part. No: 366400*) in the instruments menu under Settings -> General -> Instrument type, and are tagged with a special label on the measurement head.

We have changed to a new filter material due to changes in the specification of polarization filters for measurement condition M3 in the next revision of the ISO 13655 standard (ISO 13655 – Graphic technology – Spectral measurement and colorimetric computation for graphic arts images) and the discontinuation of production of the current polarization filter material.

The new material shows an improved combination of a polarization filter with a UVcut filter and suppresses wavelengths below 400 nm much more efficiently than the filter material used to date. The improved UVcut behavior increases the comparability of measurements between samples containing varying amounts of optical brightening agents (OBAs). The new polarization filter material also increases the inter-instrument agreement.

An upgrade program through X-Rite service is available for customers with older instruments who would like to benefit from the new polarization filter. The upgrade includes the new polarization filter and a re-certification of their instrument.

Differences in measurement results between instruments with the old and the new polarization filter may appear for samples containing high amounts of OBAs and for fluorescent samples, as a consequence of the increased UVcut behavior of the new filter material.

Sample color deviations between instruments with old and new polarization filter

Testchart	Sample	ΔE^*_{2000}
Altona Test Suite 1.2 | PT 1 | OBA	Paper	2.1 ⚠
Altona Test Suite 1.2 | PT 1 | OBA	Cyan	0.5
Altona Test Suite 1.2 | PT 1 | OBA	Magenta	0.4
Altona Test Suite 1.2 | PT 1 | OBA	Yellow	0.0
Altona Test Suite 1.2 | PT 1 | OBA	Black	0.0
Altona Test Suite 1.2 | PT 5 | no OBA	Paper	0.0
Altona Test Suite 1.2 | PT 5 | no OBA	Cyan	0.0
Altona Test Suite 1.2 | PT 5 | no OBA	Magenta	0.0
Altona Test Suite 1.2 | PT 5 | no OBA	Yellow	0.0
Altona Test Suite 1.2 | PT 5 | no OBA	Black	0.0
Pantone guide solid coated | OBA	Paper	1.2 ⚠
Pantone guide solid coated | OBA	Pantone 656 C | low density blue	1.8 ⚠
Pantone guide solid coated | OBA	Pantone 804 C | fluorescent orange	1.2 ⚠
Pantone guide solid coated | OBA	Pantone Reflex Blue C	0.3
Pantone guide solid coated | OBA	Pantone Warm Red C	0.4
Pantone guide solid coated | OBA	Pantone Green C	0.2

Comparison of measurement results between SpectroEye instruments with old and new polarization filters

The following cases are uncritical:

- Comparison of measurements on substrates containing no or little amounts of OBAs
- Comparison of measurements with filters unlike the polarization filter
- Comparison of measurements of samples with high pigment concentrations
- Comparison of measurements between instruments with the old polarization filter
- Comparison of measurements between instruments with the new polarization filter

The following cases might lead to color deviations up to ΔE^*_{2000} 2.1:

- Comparison of measurements of samples with very low pigment concentrations (e.g. pastel colors) based on substrates with a high amount of OBAs
- Comparison of measurements of the plain substrate if the substrate contains a high amount of OBAs

Considerations for print process control applications

The CIE L*a*b* values for substrates containing OBAs may show significant deviations between old and new polarization filter measurements, the **color and density values** for the primary colors in the printing process will show no, or only slight deviations, as most printing inks behave like a UVcut filter at higher pigment concentrations. As a consequence there is no need to change target values for the CMYK printing process.

Due to the increased UVcut behavior of the new polarization filter the excitation of optical brightening agents in the substrate is significantly smaller as with the polarization filter used to date. As a consequence CIE L*a*b* values for color measurements on the plain substrate may deviate up to ΔE^*_{2000} 2.1 from measurements with the old polarization filter. The actual deviation depends on the amount and the degradation of the OBAs used in the substrate. Beside the color deviations for the comparison of substrates, pastel spot colors (e.g. Pantone 656 C) may also show minor differences of color.

X-Rite recommends that you re-measure references of critical color samples and OBA containing substrates with the new polarization filter.

For tonal value increase curves (TVI) determined from prints on OBA containing paper, differences below 1% may appear if the user changes between the old and the new polarization filter material.

Pantone Guide and ISO 12647-2 reference data in SpectroEye

Instruments with the old and the new polarization filter can use the same databases.

Instructions for InkFormulation software

Users of X-Rite's InkFormulation software should avoid using spectral data for substrates in the database measured with an old polarization filter when formulating new recipes releying on measurements of an instrument with the new polarization filter. X-Rite recommends that you re-measure substrates before formulating with an instrument with the new polarization filter.

Instructions for ColorQuality software

Users of X-Rite's ColorQuality software should evaluate the consequences for their existing standards databases when switching or upgrading from instruments with the old polarization filter to the new. X-Rite recommends that you re-measure reference samples of critical color samples with the new polarization filter.

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