Colorimetric measurement problem for fluorescent (foto) paper

Measurement problem only for *absolute* and not for *relative* colour reproduction

Example of measurement

Two measurement devices A and B measure two CIELAB b^* data for two yellow colours no. 1 and 2:

Device A *without* measurement of fluorescence (example *xy*-device)
$b^*_{A1} = 100$ and $b^*_{A2} = 90$.
Device B *with* measurement of fluorescence (professional device)
$b^*_{B1} = 90$ and $b^*_{B2} = 81$.

***Absolute* colour reproduction**

For equal measurement data of A and B the visual colour difference is $\Delta b^*_{A2,B2} = 9$

This is three times *above* the colour tolerance $\Delta E^*_{ab} = 3$ of ISO/IEC 15775.

Result:
Measurement device A is **not** appropriate.

***Relative* colour reproduction**

Measurement differences of A and B:
$\Delta b^*_{A1,A2} = 10$ and $\Delta b^*_{B1,B2} = 9$
This is a measurement failure of $\Delta b^* = 1$

The failure is three times *below* the colour tolerance $\Delta E^*_{ab} = 3$ of ISO/IEC 15775.

Result:
Measurement device A **is** appropriate.

Remarks: compare CIE 163:2004, The effects of fluorescence in the characterization of imaging media.

For the achromatic colour no. 1 the devices A and B may measure:
$b^*_{A1} = 0$ and $b^*_{B1} = -10$
This is again an measurement shift $\Delta b^*_{A1,B1} = -10$
which is based on the fluorencent paper in the application.