

Technical Note 6

Application hints to use specbos 1201/ 1211 for surface color measurement

The spectroradiometers **specbos 1201/ 1211** can also be used for surface color measurement. The 45°/ 0° as well as the diffuse/ 8° measuring geometry can be applied.

Preparation:

Following parts are necessary:

1. the color measuring program JETI color
This program has to be installed on the PC according to the operation instruction.
2. a broadband light source
In case of the 45° / 0° geometry it has to be a collimated source, directed on the measuring sample. If a sphere for a diffuse illumination is applied, it has to be ensured that the light intensity on the sample is high enough to avoid extremely long measuring times. In all cases the light source has to cover the wavelength range of 380 ... 780 nm or at least of 400 ... 700 nm without any spectral gap. Furthermore, the light output has to be stable to obtain reproducible measuring results.
3. a white reflexion standard
The reflexion data for the choosen measuring geometry (transmission data range from 0 ... 1) for the wavelength range of 380 to 780 nm in steps of 5 nm have to be arranged in a file according to the following structure:

Standard name

```
0.968 0.969 0.969 0.970 0.970 0.969 0.968 0.969 0.970 0.970 ..... 0.990  
0.991 0.993 0.991 0.989 0.987
```

The file has to contain 81 values, each with 3 digits, and the file extension is .stw.

A standard file with a reflectivity of 100% for all wavelengths is included on the CD

(def_standard.stw) which can be used for tests or relative measurements if the real reflexion data are not available. Use this file as template if you prepare your individual standard file to avoid compatibility problems.

Measuring procedure:

First arrange the measuring set up (45°/0°) or (d/8°) and connect the instrument to the PC.

Remark: Use the laser target function of the radiometric software LiVal/ LiMes to mark the measuring area during alignment. It is also possible to use the switch on the rearside if **specbos 1211** is used.

Place the white reference standard at the measuring position and start the program JETI color (actual version: 1.5.3). Switch on the light source, press **F12** and click on the button **Calibration**.

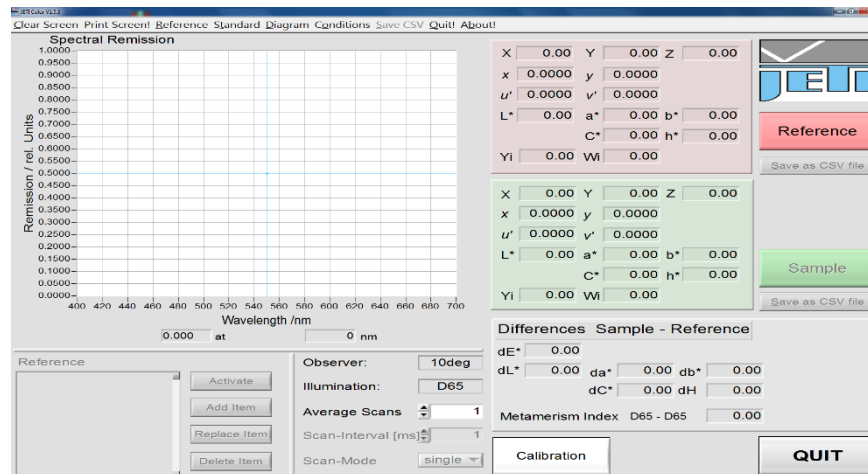


Figure 1: Screen after staring JETI Color (display of empty Remission spectrum area)

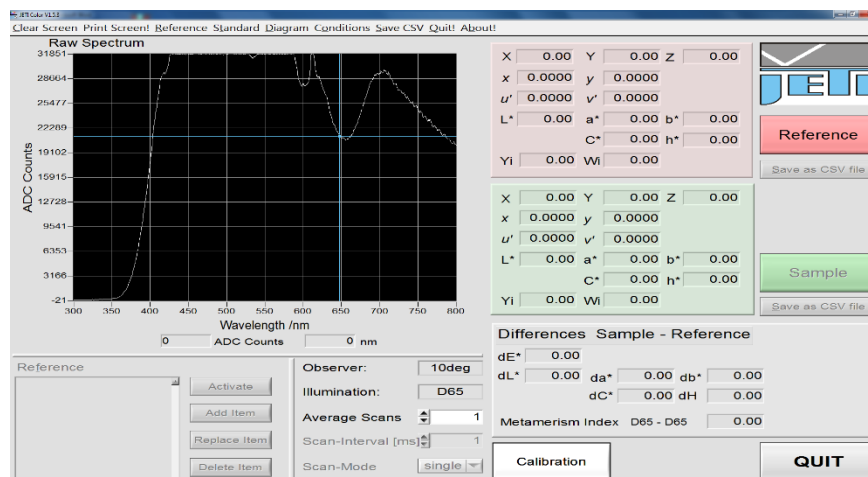
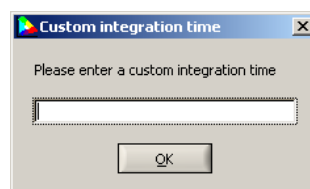
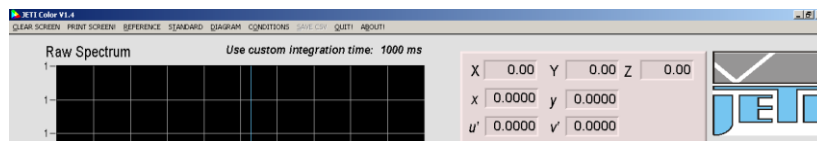


Figure 2: Screen after pressing F 12 and first measurement (display of raw data spectrum with underexposure)

The maximum of the raw spectrum has to be between 13 000 and 15 000 counts for **specbos 1201** and between 25 000 and 29 000 counts for **specbos 1211**. If this is not true **CTRL T**. It opens the following window:



Type in the integration time of 1000 [ms] and press **OK**.
The integration time will be displayed above the diagram.



Check the maximum of spectrum again. Repeat the procedure with increased or reduced integration time until the maximum is in the indicated range. The next **CTRL T** load the original stored integration time.

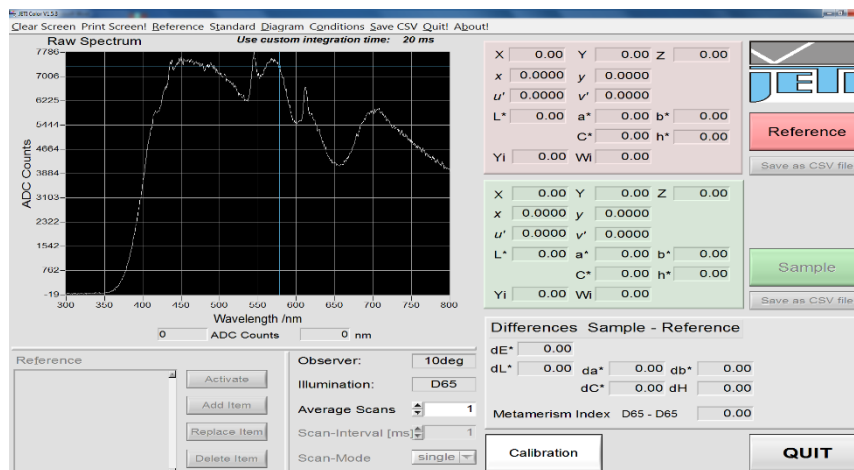


Figure 3: Screen shot with underexposure

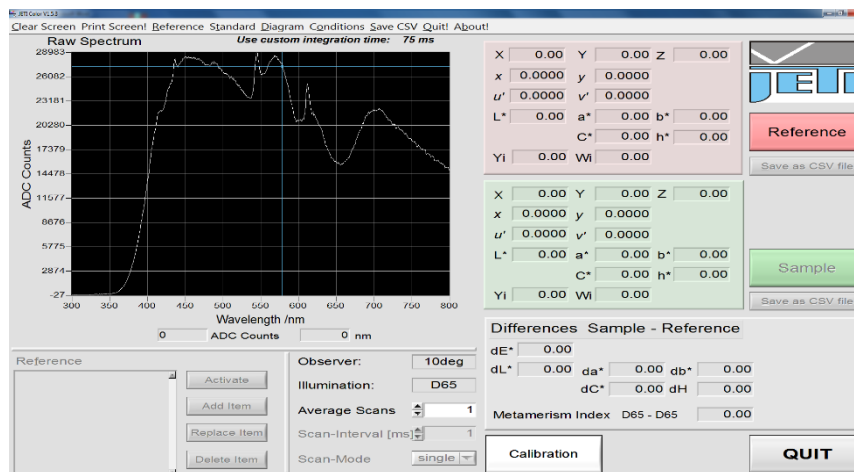


Figure 4: Correct exposure for specbos 1211

Now load the reference standard file with the menu point **STANDARD/ load from disk** and store it inside the instrument with **STANDARD/ save to device**. Afterwards click the **Calibration** button. Then change the diagram to display the reflexion spectrum (F6) or any desired chromaticity diagram (F7 ... F9).

The system is ready now for measurements.

Use the white standard for a **Reference** and a **Sample** measurement. The shown color differences give an information about the reproducibility of the setup.

Replace the white standard by the samples to be measured and follow the operation instructions of JETI color.

Additional application hints

- Ensure the stability of the light source by a appropriate warm up time.
- Protect the measuring setup from the influence of environmental light, which could influence the measuring result.
- Repeat the adjustment of integration time if the light source or the other measuring set up was changed.
- **It is necessary to enter the obtained integration time again by CTRL T if the program is used next time. Start with the Calibration using the white reference.**

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