

# Calibrate diffusor

First of all, and this is very important, you must choose the light source that you will use to calibrate the spectrometer.

Its color temperature must be between 4000 and 6500K. Not below because you would have insufficient blue values, conversely if you are above 6500K the red values will be low for a good calibration. A CCT of 5000K is perfect.

Its CRI (Color Index Renderer) must be at least 90 (the Ra is written on the bulb box).

Its shape must be flat like a spotlight, especially not a bulb with a rounded shape.



For my part I chose a 5000K "full spectrum" COB LED but it is not mandatory.

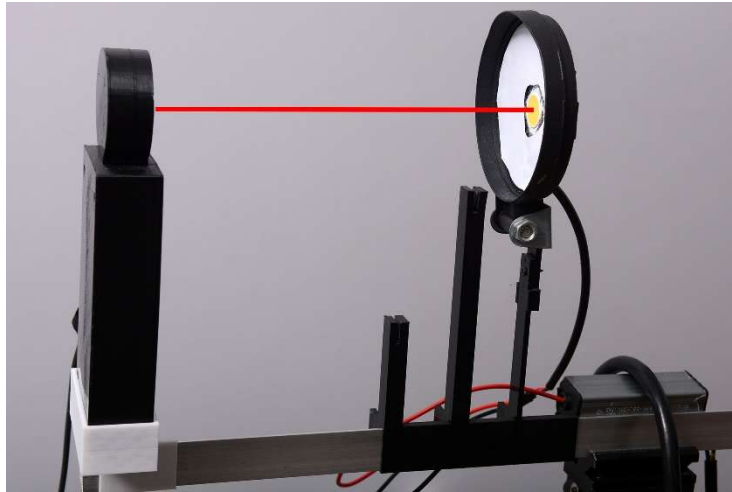
Here is my homemade calibration LED which works very well:



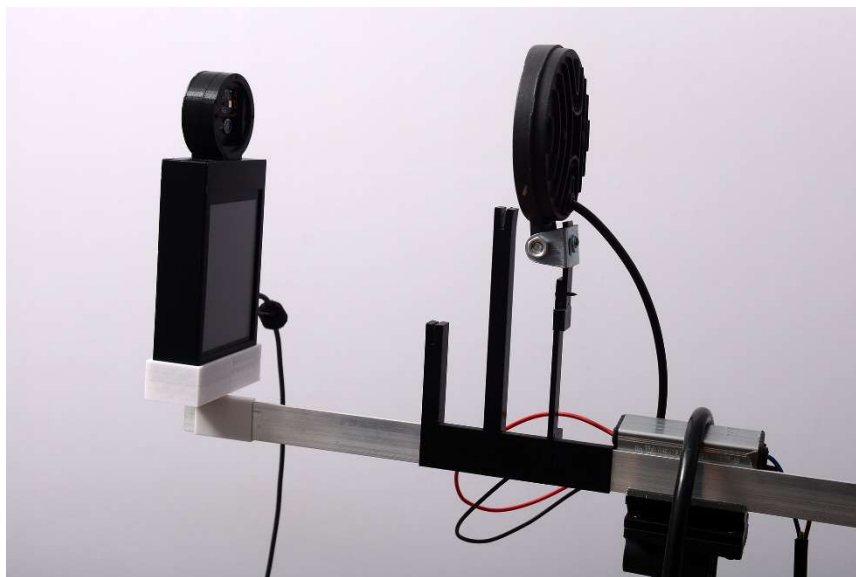
You have chosen the LED that will be used to perform the calibration, let's move on to setting up the calibration.

It is absolutely necessary that the distance between the spectrometer's AS7341 sensor and the calibration LED remains the same to the nearest millimeter throughout the calibration.

The center of your LED must be aligned in height with the AS7341 sensor.



I used a 20 x 20 x 1.5 mm aluminum angle on which I put 3D printed supports (I provide you with my supports in STL format in the ZIP file).



This way the LED and the box are perfectly stable and their distance will remain constant during calibration.

The distance between the box and the calibration LED must be around 15 cm depending on the power of the LED. A 4 Watt LED will be placed at 10 - 15 cm. A 10 - 20 Watt LED will be placed at 15 - 20 cm.

That's it, you have everything prepared and fixed to do the calibration. Make the room dark with only the calibration LED on.

You have removed the diffuser from the box to start the first measurement (measurement without diffuser).

But there is one very important thing left!!

You have to wait for your LED to warm up and especially stabilize in CCT. So you have to turn on the LED and let it light up for about 45 minutes to an hour.

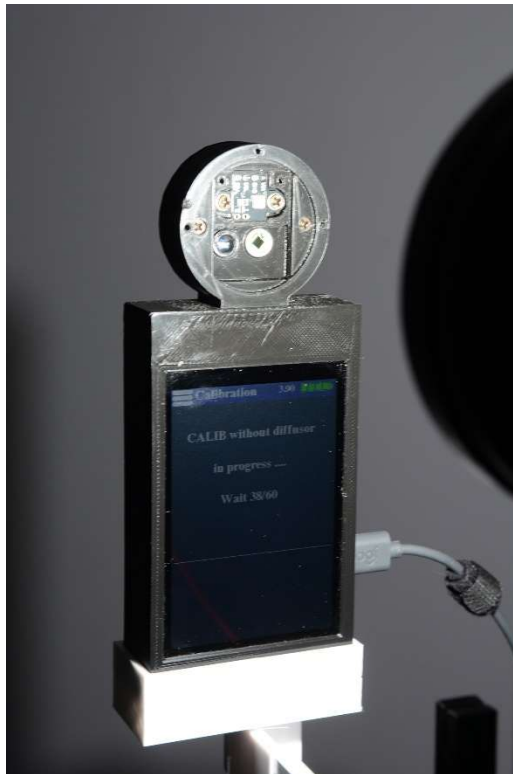
Yes, I said 45 minutes to an hour because the CCT (color temperature) of your LED will vary gradually over time.

As the calibration takes about 2 minutes, there may be a shift of a few tens of Kelvin (the Kelvin is the unit of measurement of the CCT) between the start and the end of the calibration.

You have waited 1 hour with the LED on, everything is fixed, you will be able to start calibrating the diffuser.



In the menu choose "Calibration". On the calibration window, click the "Start" button gently to avoid vibrations. As the screen is capacitive touch, there is no need to press hard on the screen but just place your finger on it.



The calibration step without diffuser starts. A counter allows you to follow the progress. You must wait 1 minute.



When the counter has reached 60/60, the "Start" button reappears but the text above has changed. You are now asked to place the diffuser on the sensor head before continuing.

Do not put the black diffuser block for the moment to avoid too much vibration and especially to change the distance between the LED and the sensor.

Once the diffuser is placed on the head, gently press the “Start” button.



The calibration step with diffuser starts, wait again about 1 minute.



When the calibration is complete, the calibration values of each channel of the AS7341 sensor appear. These values are automatically saved in the microcontroller, you do not need to do the calibration again if it is correct.

You can now replace the diffuser block with its screws, your spectrometer is calibrated.

