

MSD P10541 Microgoniophotometer Verification Testing

Temperature test:

This test was to determine the temperature of the components inside the enclosure, and if some of the electrical parts were generating too much heat. Although the heat may not directly affect data results, it could cause damage to heat sensitive parts, such as the camera, or cause an operator to burn their hand if they are not careful. To test the parts temperature, the device was left ON for 21 hours. The parts temperatures were measured using a thermocouple and the test result were as following:

Ambient room temperature: 75°F
Device enclosure temperature: 76 °F
LED block: 75 °F
LED back surface: 173 °F
Power supply: 90 °F
Camera: 92 °F

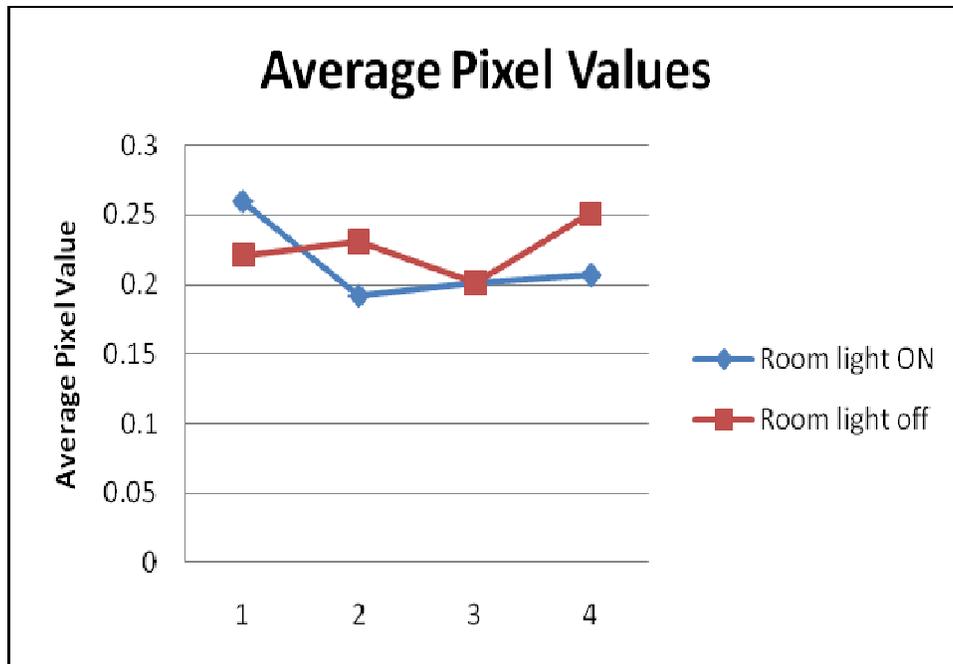
This test showed that operating the device for long time will not increase the device temperature. The temperatures for the parts are in the small surface of the part which is expected and does not increase the temperature of the device. The LEDs generate high temperature at the back small surface. This temperature will not damage and won't affect the other components.

Although the device would probably never be operated for such a long period of time, this test represents a worst-case scenario should someone accidentally leave the power on overnight.

Light test:

This test was performed to determine if there is ambient light entering the case through the small openings along where the lid edges meet the main enclosure box. It is important to seal the enclosure from incoming light as best as possible since ambient light could have a negative effect on the data results. To determine if there is external light and study the effect on the performance, the light source was turned off. Images were captured with the lid closed and room light on. The test was repeated with the room light off. The images were analyzed using ImageJ software by reading the pixel values. The results were as following:

	Max pixel value	Average pixel value
Room light on	2	0.260
	3	0.192
	2	0.201
	2	0.207
Room light off	2	0.226
	2	0.231
	2	0.20
	2	0.251



This test showed that almost no external light is entering the device which means the results should not be affected.

Vibration test:

The vibration test was performed to determine the effect of vibration on image capture and data results. If the device were to be bumped, moved, or jostled, how would this effect the results and to what extent. A test was done by vibrating the device while taking data. The results with vibration were compared to the normal results. No differences were observed in the results. That shows normal vibration (i.e. fan, table shaking, relocation, etc) is not an issue for the device.

The most important test is to use the completed device to collect data and determine if it is capable of producing accurate and repeatable results. Data would be taken using samples with known gloss measurement values. If the new device can reproduce the measurement and generate the same result multiple times, then the data results would be considered to be successful. The results would also be compared to data produced by Dr. Arney's original device in order to determine if the new device can produce equal or improved results.