

Calibrated Firefly Light Measurement Data Sheet

: Firefly

General Information

Date : 4/12/2025

Time : **Test 1** - 21.06 / **Test 2** - 22.03 / **Test 3** - 22.30 / **Test 4** - 23.04 / **Test 5** - 23.45

Location (City/Region) : Sungai Petani, Kedah, Malaysia

Approx. Temperature : 27 C

Lux Meter Model : Digital Lux Model

LED/Light Source Model : COB Rechargeable Keychain Light (Setting - **Low**)

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Firefly Data Summary

Total Fireflies Tested : 5

Distances Used : 1 cm - 5 cm from sensor

Lux Readings per Distance : 10–20 flashes (record maximum per flash)

Firefly 1

Distance: 1 cm (IN JAR)

Flash No.	Peak Lux Value	COB Lux Value	Difference
1	4.4	4.2	0.2
2	4.4	4.2	0.2
3	4.6	4.2	0.4
4	4.4	4.2	0.2
5	4.7	4.2	0.5
6	4.3	4.2	0.1
7	4.7	4.2	0.5
8	4.4	4.2	0.2
9	4.7	4.2	0.5
10	4.4	4.2	0.2

Firefly 2

Distance: 2 cm (By Hand)

Flash No.	Peak Lux Value	COB Lux Value	Difference
1	4.3	4.2	0.1
2	4.4	4.2	0.2
3	4.3	4.2	0.1
4	4.3	4.2	0.1
5	4.6	4.2	0.4
6	4.7	4.2	0.5
7	4.4	4.2	0.2
8	4.5	4.2	0.3
9	4.3	4.2	0.1
10	4.5	4.2	0.3

Firefly 3

Distance: 3 cm (By Hand)

Flash No.	Peak Lux Value	COB Lux Value	Difference
1	3.9	3.9	0.0
2	3.9	3.9	0.0
3	4.0	3.9	0.1
4	3.9	3.9	0.0
5	3.9	3.9	0.0
6	3.9	3.9	0.0
7	4.0	3.9	0.1
8	3.9	3.9	0.0
9	4.1	3.9	0.2
10	3.9	3.9	0.0

Firefly 4

Distance: 4 cm (By Hand)

Flash No.	Peak Lux Value	COB Lux Value	Difference
1	3.9	3.9	0.0
2	3.9	3.9	0.0
3	4.0	3.9	0.1
4	3.9	3.9	0.0
5	4.1	3.9	0.2
6	3.9	3.9	0.0
7	3.9	3.9	0.0
8	3.9	3.9	0.0
9	-	3.9	-
10	-	3.9	-

Firefly 5

Distance: 5 cm (By Hand)

Flash No.	Peak Lux Value	COB Lux Value	Difference
1	3.9	3.9	0.0
2	4.0	3.9	0.1
3	3.9	3.9	0.0
4	3.9	3.9	0.0
5	3.2	3.2	0.0
6	3.2	3.2	0.0
7	3.2	3.2	0.0
8	3.2	3.2	0.0
9	3.4	3.2	0.2
10	3.2	3.2	0.0

Summary of Tests (1 cm to 5 cm)

General setup:

- COB light placed at 30 cm from the lux meter.
 - Fireflies tested individually, each in a separate run.
 - Lux readings recorded based on visibility and brightness stability of each firefly.
 - COB light reference values changed slightly throughout the tests.
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Test 1 – Firefly 1 (1 cm distance)

- COB light reference reading: **4.2 lux at 30 cm**.
 - The firefly was placed inside a small container, but it was very active and moved constantly, making the readings slightly challenging.
 - Despite that, I was still able to capture several lux readings due to the very close distance.
 - Firefly 1 produced **strong and consistent flashes**.
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Test 2 – Firefly 2 (2 cm distance)

- Firefly 2 was held gently by hand for stability, which made the recording process much easier.
 - It was **very bright and actively flashing**, and lux readings were easy to capture.
 - The positioning remained stable throughout.
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Test 3 – Firefly 3 (3 cm distance)

- COB light reference value dropped slightly to **3.9 lux**.
- For this test, I also held the firefly by hand.

- However, Firefly 3 produced **much weaker and dimmer flashes** compared to Firefly 1 and 2.
 - Because of the low brightness, only a limited number of lux readings could be recorded.
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Test 4 – Firefly 4 (4 cm distance)

- Similar to Firefly 3, this firefly also produced **very weak flashes**, even dimmer at times.
 - It became difficult for the lux meter to detect meaningful readings at this distance.
 - Firefly 4 completely **stopped flashing by the 9th and 10th attempts**, so I could not continue collecting readings. (*5 minutes waiting but still no light from firefly 4*)
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Test 5 – Firefly 5 (5 cm distance)

- COB light reference value dropped again to **3.2 lux**.
- Firefly 5 produced **very bright flashes**, noticeably stronger than Firefly 3 and 4.
- Although not every flash was bright, the lux meter still managed to pick up multiple valid readings at 5 cm.

Conclusion

After completing all five tests, I noticed that not all fireflies produce the same brightness level. This could possibly be related to gender differences, although I'm not certain about that. The lux meter readings were also consistently minimal, which may be due to the specific species of fireflies I managed to collect. Based on the information I found online, there are many different species, and the ones I obtained are very small in size—this might also be a contributing factor.

I also observed that the fireflies were most active during my first test at around 9 PM. It's possible that timing plays an important role in determining how bright they glow. For example, during Test 3 and Test 4, the fireflies became less active and their light output dropped significantly, though this might also be related to gender or natural behaviour. At this point, I can't confirm the exact cause.

$\text{COB} - (\text{Low})$ 30cm : 4.2 Lux

Firefly 1 (in Jar)		Firefly 2 (Finger)		Firefly 3 (〃)	
<u>1cm</u>	<u>Lux</u>	<u>2cm</u>	<u>Lux</u>	<u>3cm</u>	<u>Lux</u>
1.	4.4	1.	4.3	1.	3.9
2.	4.4	2.	4.4	2.	3.9
3.	4.6	3.	4.3	3.	4.0
4.	4.4	4.	4.3	4.	3.9
5.	4.7	5.	4.6	5.	3.9
6.	4.3	6.	4.7	6.	3.9
7.	4.7	7.	4.4	7.	4.0
8.	4.4	8.	4.5	8.	3.9
9.	4.7	9.	4.3	9.	4.1
10.	4.4	10.	4.5	10.	3.9

Firefly 4 (〃)		Firefly 5 (〃)	
<u>4cm</u>	<u>Lux</u>	<u>5cm</u>	<u>Lux</u>
1.	3.9	1.	3.9
2.	3.9	2.	4.0
3.	4.0	3.	3.9
4.	3.9	4.	3.9
5.	4.1	5.	3.2 (COB)
6.	3.9	6.	3.2
7.	3.9	7.	3.2
8.	3.9	8.	3.2
9.	-	9.	3.4
10.	-	10.	3.2