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LED Light Therapy Color Meanings

A quick guide to wavelengths, device labels and spec numbers, with the latest facts and figures for 2026.



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What a color label tells you

A color name on an LED device is shorthand for a band of wavelengths. Wavelength, measured in nanometers (nm), is the number that says which light the diodes emit. The name is a convenience, and manufacturers apply it loosely.

The visible spectrum and where real devices land

Color	Spectrum band	Wavelengths listed in recent FDA summaries
Violet	380-450 nm	Blue mode at 415 nm (see note below)
Blue	450-495 nm	None listed
Green	495-570 nm	520 nm
Yellow	570-590 nm	590 nm
Orange	590-620 nm	Amber mode at 605 nm
Red	620-750 nm	630 nm (both devices)
Near-infrared	above about 750-780 nm	830, 850 and 880 nm

Band edges follow a standard physics table (Science World). Sources place the end of red anywhere from about 700 to 780 nm, so treat the edges as approximate. Device wavelengths come from FDA 510(k) summaries K253073 and K251588.

Four label quirks worth knowing

- **Names and bands do not always match.** A "blue" mode listed at 415 nm sits in the 380-450 nm band that physics tables call violet.
- **Neighbor colors blur.** Yellow at 590 nm sits right on the yellow-orange boundary, and amber at 605 nm falls in the orange band.
- **One label, many wavelengths.** Across two cleared devices, "infrared" appears at 830, 850 and 880 nm. That is a 50 nm spread under a single word.
- **Purple and white describe a mix.** Neither has a spectral band of its own. Purple modes usually pair red and blue LEDs, and white LEDs emit a broad spread, so the spec sheet has to say what is inside.

The numbers behind a color

A color name settles the wavelength roughly. Two more numbers describe how much light reaches the skin, and a good spec sheet lists all three.

Term	Unit	What it tells you
Wavelength	nm	Which light the LEDs emit. Tolerance matters: the FDA summaries above list ±5 nm for one device and ±10 nm for the other.
Irradiance	mW/cm^2	Light power landing on each square centimeter of skin. One manufacturer guide puts most facial masks between roughly 30 and 100 mW/cm^2.
Dose (fluence)	J/cm^2	Total energy delivered per square centimeter over a session. It rises with both irradiance and time.

Dose (J/cm^2) = irradiance (mW/cm^2) × time (seconds) ÷ 1,000

Example: 40 mW/cm^2 for 10 minutes (600 s) gives 40 × 600 ÷ 1,000 = **24 J/cm^2**. A unit at 80 mW/cm^2 reaches the same 24 J/cm^2 in 5 minutes.

Why LED count says little

LED count measures coverage. Strength comes from irradiance. A manufacturer guide gives the example of a 480-LED mask at low irradiance delivering less intense light than a 320-LED mask at higher irradiance.

Distance changes the result too. Light weakens as it travels, so a rigid mask sitting about 1 cm off the skin loses some intensity across that gap. Two masks with the same published irradiance can deliver different doses depending on fit.

More is not always better

The same guide describes a biphasic dose response: too little light does little, and too much can do less. It also describes the useful window for skin as roughly 600 to 850 nm. Both points come from a manufacturer, so read them as industry context and check them against the evidence for any specific device.

Latest facts and figures

Market numbers from two 2026 reports, plus what recent FDA paperwork says about color labels.

USD 1.08B

Global light therapy market in 2026, all light types. Forecast: USD 1.33B by 2031 (4.38% CAGR).

Mordor Intelligence, updated Aug 10, 2026

USD 793.7M

US wearable LED light therapy devices, 2026 estimate. USD 657.1M in 2025; USD 1,556.9M by 2033 (10.1% CAGR).

Grand View Research

59.0%

Share of 2025 US wearable LED light therapy revenue from LED face masks.

Grand View Research

55.8%

Share of 2025 US wearable LED revenue held by red light, the largest light technology segment.

Grand View Research

The two reports define their markets differently (all light therapy versus US wearable LED), so compare trends, not dollar figures. Mordor also reports that blue held 35.30% of global light therapy revenue in 2025, and forecasts red at a 4.72% CAGR through 2031.

What FDA paperwork shows about labels

- **Class and code.** Both recent 510(k) summaries reviewed here list Class II under 21 CFR 878.4810, product code OHS.
- **K251588 (decision Aug 21, 2025), LED face mask.** Lists red 630, blue 415, yellow 590, green 520 and infrared 880 nm, each ±5 nm. The summary states the green mode has no medical therapeutic effect and leaves it out of the indications.
- **K253073 (decision Nov 19, 2025), LED device.** Lists red 630, amber 605 and infrared 830 or 850 nm with a ±10 nm tolerance.
- **Clearance is per device and per indication.** A color can sit on a product without being part of what the FDA reviewed.
- **Safety standard.** IEC 62471:2006 covers photobiological safety of lamps and lamp systems, LEDs included, across 200 to 3,000 nm. That range spans every color in this guide.

Read any color label in 5 steps

1. **Find the nanometer number.**
   If the listing only says "red" or "blue", ask for the wavelength.
2. **Check the tolerance.**
   A ±5 nm spec and a ±10 nm spec describe different precision.
3. **Find irradiance and distance.**
   Look for mW/cm^2 and whether it was measured at the skin.
4. **Work out the dose.**
   Multiply irradiance by session seconds, then divide by 1,000.
5. **Match the color to the clearance.**
   Look up the device's FDA summary and see which modes it covers.

Sources

Mordor Intelligence, Light Therapy Market (updated Aug 10, 2026): https://www.mordorintelligence.com/industry-reports/light-therapy-market

Grand View Research, U.S. Wearable LED Light Therapy Devices Market: https://www.grandviewresearch.com/industry-analysis/us-wearable-led-light-therapy-devices-market-report

FDA 510(k) K253073 summary, via Innolitics: https://fda.innolitics.com/device/K253073

FDA 510(k) K251588 summary, via Innolitics: https://fda.innolitics.com/device/K251588

IEC 62471:2006, VDE Verlag listing: https://www.vde-verlag.de/iec-normen/212931/iec-62471-2006.html

Science World, visible light wavelength table: https://scienceworld.ca/?p=17024

Shimadzu, visible and near-infrared ranges: https://www.ssi.shimadzu.com/service-support/faq/uv-vis/light-and-theory/4/index.html

NASA Science, visible light: https://science.nasa.gov/ems/09_visiblelight/

Solawave, how to read an LED face mask spec sheet (manufacturer guide): https://www.solawave.co/blogs/news/how-to-read-an-led-face-mask-spec-sheet

This guide explains label and spec terms for general information. It does not make treatment claims or replace advice from a healthcare professional.