

Understanding UV Nail Lamps

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Traditional and LED Style

Two styles of UV nail lamps are used in salons to cure UV nail products; Traditional and LED. Although these nail lamps use different types of bulbs, both types emit UV and can quickly harden UV curable artificial nail coatings. The bulbs used in traditional UV nail lamps are "fluorescent tubes," while the bulbs used in newer LED style UV nail lamps are called "Light Emitting Diodes" or LED for short.

Ultra-violet (UV) is divided into three main categories; UVA, UVB and UVC. Each of these categories defines a broad range of UV "wavelengths" found in sunlight. * Only a small fraction of the many UV wavelengths in natural sunlight are useful to cure artificial nail coatings. UV nail bulbs are specially designed to emit UVA, with very little or no UVB and never any amounts of UVC. Artificial nail coatings are specially formulated to cure (polymerize)[†] using relatively low levels of UVA, much less than what is needed to tan skin. The UVA band consists of 85 different wavelengths, not all of these are useful for proper curing of UV curable artificial nails. These wavelengths have the lowest energy of any type of UV and therefore are considered safer for skin exposure, especially in cases of brief and/or infrequent, low level exposures, as is the practice with salon services.

A UV curable nail product formulation determines which UVA wavelengths are most important for proper curing and this can vary widely between various products. If a UV nail lamp does not match the curing requirements of a particular UV nail product, then either over or under curing becomes more likely. Proper curing requires exposing the UV curable coating to the correct wavelengths at the right intensities and for the proper length of time. For example, if a UV nail lamp doesn't produce sufficient intensities of wavelengths needed to properly cure a specific

* The "wavelength" describes the level of energy (shorter wavelengths have higher energy).

[†] Not to be confused with hardening by evaporation, e.g. traditional nail polish.

formula, the result will be "under curing." It is important to note that UV nail coatings can solidify or harden even when they are significantly under cured; therefore solidification does not ensure the UV coating is properly cured. Over curing can also result in service breakdown and may cause heat spikes that can burn sensitive tissues of the nail bed and lead to onycholysis (separation of the nail plate from the bed). Improper curing of nail coatings may result in service breakdown and can increase the potential for adverse skin reactions.

LED style nail lamps have higher intensities of the UVA wavelengths most important to curing, so they can provide faster curing times which can lead to over curing of formulations not intended for use with LED style lamps. To help ensure proper curing, it is important to use the correct UV nail lamp- one designed for the UV nail coating product of your choice. There is no such thing as a "universal nail lamp" that will properly cure all types of UV curable nail products nor is there a UV curable product that properly cures with any UV nail lamp. UV nail products are designed to cure best with a specific UV nail lamp- one that was designed to emit the correct wavelengths and deliver the appropriate intensities for the proper time duration.

Wattage is incorrectly believed to be the UV strength of the lamp; however, wattage is actually the amount of power needed operate the UV bulb and is NOT a measurement of UV output. Therefore different UV nail lamps with the identical wattage are likely to cure the same UV nail product to different degrees and this may result in either under or over curing.

Safety of UV Nail Lamps

UV nail lamps have a long history of safe use and have been widely used in salons for over 30 years. Two scientific studies have confirmed that both traditional and LED style UV nail lamps are safe for use in salons. The first study was previously outlined in an NMC brochure entitled, "Do UV Nail Lamps Emit Unsafe Levels of Ultraviolet Light?" In that study, Lighting Sciences, Inc./Phoenix, Arizona tested two widely used UV nail lamps and determined that UVB output from these lamps was less than that found in natural sunlight. UVA exposures were found to be equivalent to spending an extra 1.5 to 2.7 minutes in sunlight each day between salon visits or an extra 10 to 20 minutes outdoors once per week. A second study was conducted by two

world leading scientists specializing in UV affects on skin: Dr. Robert Sayre, inventor of the SPF rating system for sunscreen and his associate Dr. John Dowdy, Rapid Precision Testing Labs/Cordova, Tennessee. After extensively studying many types of traditional and LED UV nail lamps, this world-renowned team discovered that exposure resulting from regular salon use of UV nail lamps is equivalent to receiving between 0.5% to 2.2% of the permissible monthly UV exposure defined by internationally accepted standards. This narrow range demonstrates that there is not much difference in UV exposure between traditional and LED style UV nail lamps; both lamp styles are well within safe levels. It is important to note that the back of the hand is the least UV sensitive part of the body and four times more UV resistant than the forehead or cheek, which even further increases the margin of safety.[‡] After considering all of these facts, including the relatively low level of UV released by nail lamps, Dr. Sayre concluded, "*UV nail lamps are safer than natural sunlight or sunlamps... and properly belong in the least risky of all categories.*"

A fair examination the facts supports the conclusion that UV nail lamps are safe when used as directed and brief client exposures are as safe or safer than brief exposures to natural sunlight. Client hands are likely to be exposed to more UV while driving their cars than what they can expect to receive from UV nail services. Should a client express anxiety, nail technicians may consider doing the following to make the service more reassuring:

- Use a small piece of cloth to cover the hands when placing them in the UV nail lamp.
- Client may wear SPF15+ broad-spectrum sunscreen, but should still wash their hands before any salon service begins. Nail technician should take special care to ensure nail plates are properly cleansed and the surfaces dehydrated in order to prevent service breakdown (e.g. product lifting, discoloration or mottling), which may result from sunscreen product residues left on the nail plates. Also, it is crucial to keep sunscreen lotions and sprays away from implements and supplies used during the nail service to avoid contamination.

[‡] Olson, R. L., R. M. and M. A. Everett (1966) Effect of anatomic location and time on ultraviolet erythema. *Arch Dermatol* **93**, 211-5.