



EVIDENCE GUIDE · FORMULAS

What sunscreen ratings mean for everyday protection

Most sunscreens fail from thin layers and missed reapplication, not low numbers. This guide reads the ratings, the filters and the new US rule so you can judge what a formula can show.



UV behavior

UVA ages quietly each day while UVB burns near midday.



Rating limits

Lab SPF overstates thin real world layers and skips UVA amount.



Use first

Full measure and timely reapplication decide the result.

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Morning light through glass feels mild, yet the single fact that should change behavior is that thin application lowers protection more than the SPF number raises it. People often select SPF 50 or higher and then use too little, too late, with little attention to UVA. When wavelength behavior, labeled ratings, filter types and amount are separated, choice becomes calmer and more consistent.

01

How UVA and UVB act

Sunlight arriving at skin includes two ultraviolet bands that do not behave the same. One source gives UVA as 320 to 400 nm and UVB as 290 to 320 nm, while a review gives UVA as 315 to 400 nm and UVB as 280 to 315 nm. A review states UVA accounts for about 95 percent of terrestrial UV radiation and UVB accounts for about 5 percent. That proportion explains why routine exposure accumulates even without any pink color.

UVA penetrates to the dermis, the deeper layer that holds structural support. It is associated with wrinkles, loss of elasticity, photoaging and DNA damage that can increase skin cancer risk. UVB remains nearer the surface, delivers more energy, and is the main driver of sunburn and direct DNA damage. UVB also stimulates vitamin D production, which is one reason total avoidance of sun is not the goal.

Timing also differs. UVA occurs through all daylight hours across the year and can pass through clouds and windows, so desks near glass and gray days still contribute. UVB peaks in summer and between 10 a.m. and 4 p.m., when shade and scheduling matter more. Plants meet the same pattern by thickening leaves and making protective compounds, and skin also responds better to a stable routine than to one intense effort.

02

What SPF, broad spectrum and PA state

SPF mainly describes defense against UVB sunburn, assessed by comparing the UV dose needed to produce sunburn with and without sunscreen. In use the scale climbs by narrow increments. SPF 15 stops about 93 percent of UVB, SPF 30 stops about 97 percent, SPF 50 stops about 98 percent and SPF 100 stops about 99 percent. The shelf gap between SPF 30 and SPF 50 appears wide and proves narrow on skin, which is why quantity and reapplication often alter outcomes more than the figure.

Broad spectrum on a US label signals defense against both UVB and UVA radiation. The term informs buyers that UVA cover is present, yet it supplies no value for the level. How much UVA protection any specific broad spectrum SPF product gives without a PA or PPD value on the label remains unknown, and that boundary deserves attention when two bottles are compared.

PA means Protection Grade of UVA, created in Japan from the Persistent Pigment Darkening method that tracks UVA induced tanning. PA grades group PPD values as 2 to 4 for PA+, 4 to 8 for PA++, 8 to 16 for PA+++ and 16 or higher for PA++++. Buyers concerned with dark spots or uneven tone can employ PA as another measure, alongside SPF. A formula carrying both a sound SPF and a high PA grade presents a clearer account of defense across the day.

FROM THE EDITORS

Controlled lab tests apply sunscreen generously to derive SPF and PA. Protection in daily life often tests lower than lab SPF, mainly when the layer is thin or patchy. Use ratings as a guide for choice, then let careful use do the work.

03

How mineral and chemical filters differ

Sunscreen filters divide into two broad groups that manage light through different routes. Mineral ingredients zinc oxide and titanium dioxide act as physical sunblock that reflects UV. Chemical ingredients such as oxybenzone or avobenzone absorb UV and release it as heat. Many current formulas combine several filters to extend spectral coverage while retaining agreeable texture.

Avobenzone was cleared in 1988 and remains the main US UVA filter, but it can degrade in sunlight unless stabilized. Manufacturers often combine it with stabilizers or other filters so defense endures longer on warm skin. Newer filters show broader and more stable protection in

lab and market use, but some users can still develop allergy or irritant dermatitis. Anyone with stinging, itching or rash that persists should pause use and ask a clinician, and patch testing can help before a full face trial.

Texture influences routine as strongly as chemistry. Mineral formulas may leave a white cast, especially on deeper tones, which can deter daily use. Chemical and mixed formulas often apply more sheer, although scent, finish and eye sensitivity differ across users. Research cannot predict which texture or filter blend will suit one skin type without trial, patch testing or clinician advice. Testing slowly, one change at a time, protects skin and spending.

04

Why US choices were narrow and what shifted

The reason US shelves looked narrow for years comes down to regulation. The US controls sunscreen filters as over the counter drugs, while the EU and South Korea control them as cosmetics with a faster update path. Counting FDA listed UV filters in the US gives 16 in total, with only zinc oxide and titanium dioxide in Category I as generally recognized as safe and effective and the rest in Category III needing more data. Animal testing rules can slow US innovation, while rigorous testing remains needed for safety and effectiveness.

Change arrived in stages. Congress passed the SAFE Sunscreen Standards Act in November 2025 to allow real world evidence and to require FDA to consider nonanimal testing and issue guidance. FDA issued a proposed order for bemotrizinol on December 12, 2025, accepted comments through January 26, 2026, and finalized it within about seven months. On June 9, 2026, FDA added bemotrizinol at up to 6 percent to the OTC sunscreen monograph for adults and children 6 months and older.

Bemotrizinol absorbs both UVA and UVB, is highly photostable, stays largely on the skin surface with low uptake into the body, and may be less irritating. As Carl D’Ruiz, head of beauty and care science, advocacy, and business development at DSM Firmenich, put it, modern filters like BEMT are photostable and broad spectrum, and perform effectively at lower concentrations. HHS Secretary Robert F. Kennedy, Jr. said, Bemotrizinol has been used safely in Europe for decades, and FDA action will increase competition and consumer confidence in sunscreen products. When bemotrizinol products from brands beyond the first maker will reach shelves and what they will cost is still unclear, and how much future US approvals will lower skin cancer rates is not yet shown. For now the decision adds choice around hybrid and photostable filters that may feel lighter and suit sensitive skin.

FROM THE EDITORS

Dr. Karen Murry, director of the Office of Nonprescription Drugs at the FDA's Center for Drug Evaluation and Research, said, "The FDA's rigorous standards ensure consumers can be confident in the sunscreens and other nonprescription drugs they use." Careful testing on your own skin remains necessary even with new options.

05

How much to use and when to repeat

Most people use too little and wait too long before the next layer. FDA says an average sized adult or child needs at least one ounce, about a shot glass, for the body, applied 15 minutes before exposure and again at least every two hours and after swimming or sweating. Higher SPF stops a slightly larger share of UVB but still needs generous application and reapplication. Consider sunscreen like steeping tea: strength comes from full measure and enough time.

No sunscreen is waterproof, and products called water resistant must state whether protection lasts 40 or 80 minutes while swimming or sweating. Read that number before a swim or a run, then schedule the next layer around it. Store the bottle in a cool place when possible, since heat and long storage can change texture and spread. Sprays need the same care as lotions: mist evenly, then rub in to avoid missed strips along shoulders and legs.

Facial coverage merits a separate routine. Some guides mention about a quarter teaspoon for the face, but fingers and faces differ, so aim for a full even film over forehead, nose, cheeks, ears and neck. Sunglasses and a broad brimmed hat guard the rims where sunscreen thins first. Reapply over makeup with a lotion or stick patted gently, instead of skipping the midday layer entirely.

06

What deeper and spot prone skin needs

Melanin reduces the chance of burning but the risk of skin cancer remains. That point surprises many readers with deep skin tones who rarely burn yet still face UVA driven tanning, dark spots, melasma and uneven tone. Everyday UVA can build pigment gradually, even indoors by windows or under cloud. Seeking sheer and elegant formulas that leave no white cast supports daily use, which is where real benefit grows.

Strong UVA defense matters here for tone as well as health. Look for broad spectrum claims and, when listed, PA++++ or high PPD values, since they relate directly to tanning pathways. Tinted mineral products work well for some people, while light chemical or hybrid fluids work for

others. Cost and finish shape adherence, so choose the texture you will actually wear each morning.

Attentive care also includes monitoring spots. New or changing marks, sores that fail to heal, or dark streaks under nails deserve prompt professional review on every skin tone. Sunscreen supports an even tone and may help defend against damage, but evidence suggests it works best with shade, clothing and regular skin checks. If irritation or breakouts occur, simplify the routine and ask a dermatologist for guidance suited to pigmentation prone skin.

07

Routines that support sunscreen outside the bottle

A bottle performs best within a broader pattern. FDA sun advice is to limit sun between 10 a.m. and 2 p.m., wear long sleeves, pants, sunglasses and broad brimmed hats, and use broad spectrum SPF 15 or higher regularly as directed. Shade from trees, awnings or a parasol reduces the dose on errands and lunch walks. Checking the UV Index in a weather app helps decide when to add sleeves or move a run earlier.

Care for the youngest skin centers on cover and timing. Sunscreen is not recommended for infants under six months, who should stay out of midday sun and in protective clothing, with a doctor asked before use. Light long layers, a wide hat and a stroller canopy do the quiet work. Older children still need the ounce amount, the 15 minute head start, and a fresh layer after water play.

Small field habits sustain the season. Store spare sunscreen where you will use it, by the door or in a work bag, and discard bottles that smell off or separate. Wash off sweat and sand before reapplying at the beach so the next layer adheres. At home, keep the base routine steady: cleanse gently at night, moisturize for barrier support, and make sunscreen the final light layer each morning before going out.

08

The checklist

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- ☐ Notice daylight timing and seek midday shade
 - ☐ Select broad spectrum SPF 15 or higher for everyday wear
 - ☐ Review PA grade when UVA or spots are a concern
 - ☐ Choose mineral, chemical or hybrid for finish and tolerance
 - ☐ Dispense a shot glass ounce for whole body cover
 - ☐ Include ears, neck, hands and tops of feet
 - ☐ Spread sunscreen 15 minutes before outdoor time
 - ☐ Repeat at least each two hours outside
 - ☐ Renew after swimming or heavy sweating
 - ☐ Obey 40 or 80 minute water resistance periods
 - ☐ Add hat, sunglasses and covering clothes at midday
 - ☐ Shade infants under six months and consult a doctor
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09

Sources and further reading

- FDA Expands Sunscreen Options for the First Time in 20 Years · [fda.gov](https://www.fda.gov)
- Modernizing U.S. Sunscreen Regulations: How Newer Filters Can Improve Public Health · [pmc.ncbi.nlm.nih.gov](https://pubmed.ncbi.nlm.nih.gov)
- FDA Approves First New Sunscreen Ingredient in Two Decades · ophthalmologyadvisor.com
- Sunscreen: How to Help Protect Your Skin from the Sun · [fda.gov](https://www.fda.gov)
- Better Sunscreen Is Officially Coming to the U.S. · [elle.com](https://www.elle.com)
- New Sunscreen Formulas Are on the Way · [healthcentral.com](https://www.healthcentral.com)

For information only, not medical advice. A study summary is not a diagnosis; see a board-certified dermatologist about anything that persists, spreads or hurts.



WRITTEN BY

Madeline Hawkins

Madeline runs the news desk and the evidence guides at Face Value. She reads the methods section before the abstract and keeps a tally of every study a press release cites, next to the number she could actually find.
