

Ultraviolet radiation



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All energies that move at the speed of light are collectively referred to as electromagnetic radiation or 'light'. Various types of light differ in their wavelength, frequency and energy; higher energy waves have higher frequencies and shorter wavelengths. Pigments inside the retina of our eyes absorb wavelengths of light between 400nm-700nm, collectively referred to as 'visible light'.

Ultraviolet radiation (UVR): Ultraviolet rays that are part of the energy that comes from the sun. Ultraviolet radiation (UVR) which falls between x-rays and visible light on the Electromagnetic spectrum is divided into three types, according to wavelength.

These are -

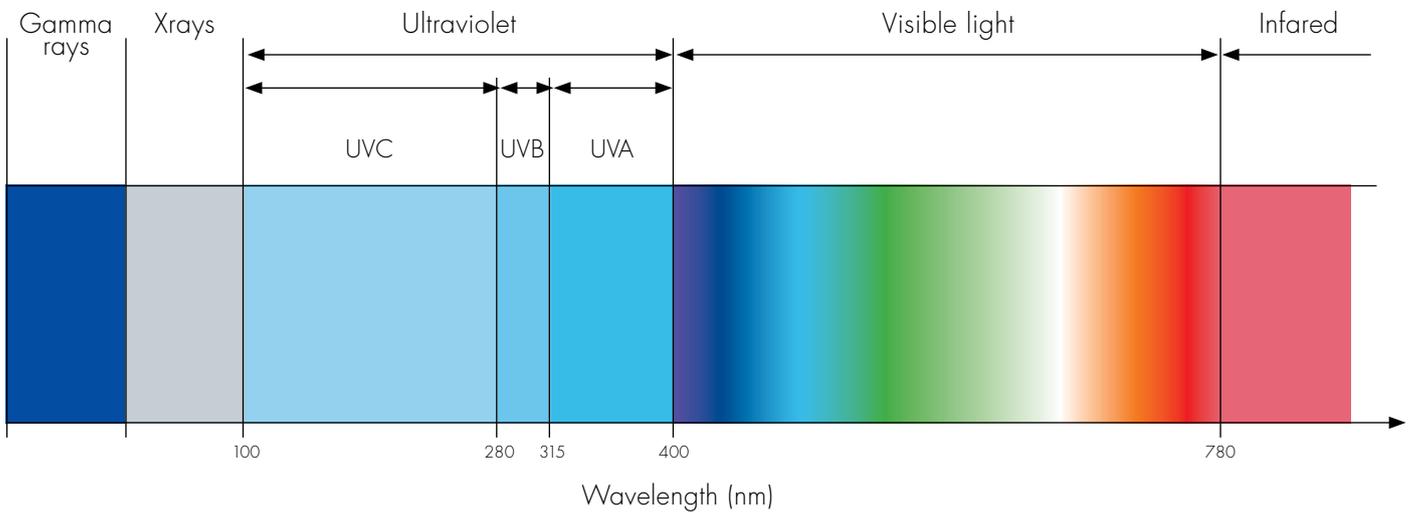
UVA: (320 - 400nm) - Long wave UV causing premature skin ageing. Degradation of collagen and elastin.

UVB: (290 - 320) - A small medium, but dangerous part of sunlight. Most solar UV-B is absorbed by the ozone layer. Prolonged exposure causes sun burn and could result in unhealthy effects on the skin and eyes. Vitamin D production.

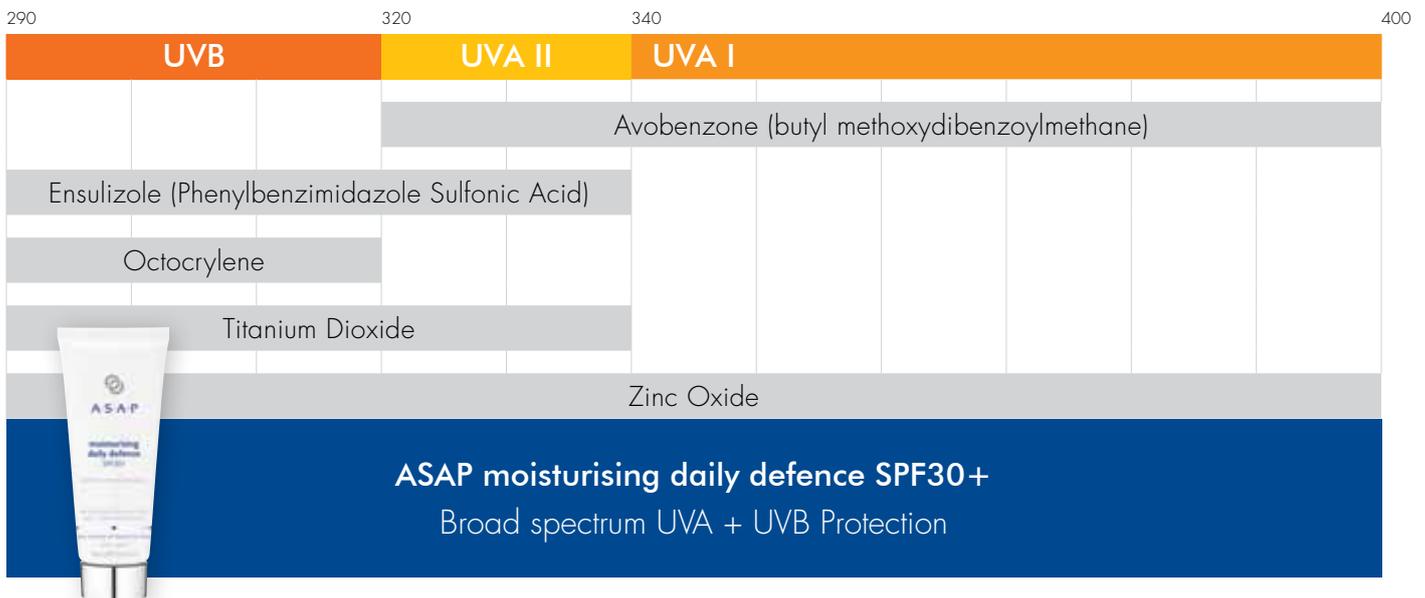
UVC: (200 - 290nm) - Shortwave UV, which includes germicidal ultraviolet at 253.7nm wavelength - is used for air, surface and water disinfection. UVC radiation is almost completely absorbed by the ozone layer and does not affect the skin.¹

A 'nm' is a nanometer which is a metric unit of length equal to one billionth of a meter.

ELECTROMAGNETIC SPECTRUM



UV SPECTRUM BLOCKING CAPABILITIES





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Type of sunscreens

Two forms of UV blocking – Chemical and Physical

sunblocks based on their mechanism of action.

UV radiation may be blocked either by absorption or reflection/scattering of UV light. Based on their mechanism of protective action, sun-blocking agents are broadly divided into physical and chemical.

Physical blockers – ZINC OXIDE, TITANIUM DIOXIDE

provides protection from UVA and UVB and sits on the skin's surface forming a protective barrier and doesn't have the ability to be absorbed into the skin. Light is either absorbed or reflected away from the body.

They are usually finely powdered and dispersed minerals; that block UV radiation mainly by reflecting/scattering the rays.

Chemical blockers – AVOBENZONE, PHENYLBENZIMIDAZOLE (ENSULIZOLE), OCTOCRYLENE

absorb sunlight to prevent sun damage but is also absorbed into the skin.

Most are synthetic chemicals that are soluble in oil and/or water.

To be truly effective and beneficial, sunscreens must protect the skin from both the sun's UVA and UVB radiation. In the United States, there are only four ingredients approved by the FDA that protect across the full UVA range: Titanium Dioxide, Zinc Oxide, Avobenzone (also called Parsol 1789 and butyl methoxydibenzoylmethane), and Mexoryl SX (Ecamsule). Outside the United States, Tinosorb is another.

ASAP moisturising daily defence SPF30+ contains three of these highlighted ingredients; Titanium Dioxide, Zinc Oxide, Avobenzone.

BROAD SPECTRUM: There are different types of ultraviolet (UV) radiation. UVA radiation penetrates deep into the skin, affecting the living skin cells that lie under the skin's surface. UVA causes long-term damage including wrinkles, blotchiness, sagging and roughening, and also contributes to skin cancer. UVB radiation penetrates the top layer of skin and is the main cause of skin damage and skin cancer. Broad spectrum sunscreen filters both UVA and UVB radiation.

SUN PROTECTION FACTOR (SPF) means the ratio of UV radiation dose required to produce a recognizable erythema on skin that has been protected with a sunscreen product to the dose required on unprotected skin under the same conditions (AS/NZS 2604: 1998).^{2,3}

Sunscreens with a sun protection factor (SPF) of 4 and above are listed on the Australian Register of the Therapeutic Goods Administration (TGA). Products can only be listed on the register if they comply with the Australian/New Zealand Standard for sunscreen products (AS/NZS 2604:1998) The highest SPF for sunscreen currently available in Australia is SPF30+.^{2,3}

Currently, the maximum SPF claim permitted in Australia is 30 plus (30+). SPF claims expressed as numbers greater than 30 are currently not permitted in Australia. A SPF 30+ sunscreen protects your skin from approximately 96.6% of the sun's rays.

REFERENCES:

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2. Cosmetic Standard 2007. Industrial Chemicals (Notification and Assessment) Act 1989. http://www.nicnas.gov.au/current_issues/cosmetics/cosmetic_standard_pdf.pdf
3. Australian/New Zealand Standard™. AS/NZS 2604:1998 Sunscreen products – Evaluation and Classification. <http://www.saiglobal.com/PDFTemp/Previews/OSH/As/as2000/2600/nn2604.PDF>