

Issued: July 2019

This document has been prepared to support our distribution partners counter some of the most common misconceptions and urban myths about silicones and their use in Personal Care.

❖ The Silicone-Free claim as a cosmetic ingredient.

The “Silicone free” claim, made in certain personal care products, has gained momentum solely as a niche marketing tool to suggest such formulations are somehow safer, more healthy or offer enhanced environment credentials than otherwise. In fact, such misinformation is pedaled through blogs and social networks with vested interests rather than through rigorous scientific premise.



❖ Silicone as a cosmetic ingredient.

Silicone is a catch-all word for one of the most useful and broadest class of raw materials used across all sectors of the personal care industry. Since the 1950s, this class of additives has imparted desirable multifunctional effect and represents a key go-to solution based on performance-price considerations. It is estimated that over 50 percent of all new cosmetic products launched contain at least one silicone.



❖ Silicones as petroleum derivatives?

Often formulators and consumers mistakenly believe that silicones are petrochemicals derived from oil. In fact, the silicone science starts with sand, also known as silica or quartz, composed of two of the most abundant elements on earth: oxygen and silicon. Silicones cannot be considered as Microplastics, which are tiny pieces of plastic that can end up in the seas, causing potential damage to the environment.

❖ Are silicones natural?

Silicones do not grow on trees, but neither do most ingredients termed “natural” used in a cosmetic formulators laboratory. Most of them have been highly processed and refined resulting in a sizeable environmental footprint. Naturals are perceived as safer, but what constitutes “natural”? There are no industry standards or agreed definitions within current legislation, only significant debate. Indeed “naturals” present their own drawbacks as assay and commercial position can be highly impacted per harvest. By contrast, the optimized process routes to synthesize silicone from sand enable consistently tight physical and chemical specifications allowing a sustainable high quality supply.



All 100% silicone products follow the principles of [The Vegan Society](#) and can be considered as vegan and cruelty-free by default. They are as well as GMO- and Palm-free ingredients.

❖ Are silicones harming the ozone layer?

Chlorofluorocarbons (CFCs) are the family of chemicals harming the ozone layer, not silicones. Chlorine gas disrupts ozone formation in the Earth's upper atmosphere, which is where the damaging reactions occur. Silicones do not contain chlorine, which means they cannot contribute to this disruption.

❖ Do Silicones contribute to smog?

The chemicals that contribute to urban smog are volatile organic compounds (VOCs). These include acetone, ethyl alcohol, isopropyl alcohol, methacrylates and ethyl acetate; such compounds are formulated into fragrances, nail and hair products and some cleansing formulations. Silicones should be considered as inorganic, therefore cannot be described as smog contributing VOCs. But the legislations are not everywhere the same.

In Europe, Low linear siloxanes and cyclics (D4, D5 & D6) are considered from the Council Directive 1999/13/EC of 11th March 1999 as organic and in certain cases seen as VOC.

In the USA, the same products - Volatile methylsiloxane (VMS) - are exempt from VOC legislation because laboratory experiments at the University of California demonstrated that, in contrast to other organic compounds of similar reactivity, the breakdown of VMSs in the atmosphere does not lead to the formation of ground-level ozone (CES, 2005b).

❖ Are silicones biodegradable?



Although silicones aren't biodegradable in the traditional sense, they do degrade in the environment, breaking down into water, silica and/or silicate and carbon dioxide. The degradation trigger for low molecular-weight silicones, including cyclopentasiloxane, is sunlight and oxygen. Heavier weight silicones aren't susceptible to degradation by UV, oxidation or ozone, instead they seek solid, water-free surfaces, adsorbing preferentially onto the biomass formed in effluent treatment plants. This sludge, as it is known in the water treatment industry, is ultimately incinerated. When deposited over soil, mineral clays catalyze the breakdown of the silicone's polymer backbone. This can take weeks and months if the soil remains wet, but if the soil dries, it can take only days. Inspection of soils treated with high concentrations of silicone showed negligible impact of microorganism activity, nor harm to plant germination and growth. Silicone is self-lubricating due to flexibility of silicone back bones so in no need to add plasticizers. This avoids further contamination to eco-system.

❖ Do Silicones bioaccumulate in humans and other animals?

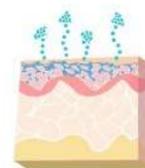
Silicones do not bioaccumulate as they are too large to pass through cell membranes—a key requirement for bioaccumulation.

❖ Are silicones safe?

Extensive research has been conducted by, and on behalf of, the silicone industry to qualify and document the use and properties of this class of raw material within their intended cosmetic application. A body of evidence exists within the public domain reinforcing our assurance that silicones in personal care are safe for the environment and human use. Silicones continue to be used in the most exigent markets, as pharmaceutical, medical devices, personal lubricants, food and intern prosthesis with no evidence of toxicity.

❖ Do silicones suffocate the skin?

Most silicones do not allow liquid water to penetrate but are breathable, allowing oxygen, nitrogen and water vapors to transport easily through them, into or out of the skin. Some silicones are cited to reduce transepidermal water loss (TEWL) which is a leading cause of skin dryness and dehydration. This is why silicones are used in wound, scar regeneration and even burn creams to form a protective barrier to prevent trans epidermal water loss (TEWL), retains moisture in the damaged skin further to lowering the chance of infection and skin irritation. Silicones can create the ideal atmosphere of moisture and oxygen to transform skin and boost collagen formation, as well as regenerate overall epidermal cells. Besides this, silicones are Clinically Proven to reduce Redness, Itching or Pain, soften scar tissue, flatten raised scars and prevent abnormal scarring.



❖ Do silicones clog pores on the skin or scalp pores and cause breakouts?



Silicones are highly resistant to oxidation, resulting in non-comedogenic properties. They do not go rancid and, as they are non-irritant, they are non-acnegenic. They are also hostile to bacterial or other microbial growth. However, silicones may increase the penetration of some ingredients, such as common irritants including fragrance or known pore-cloggers for example, lipid-rich plant oils; these then the actual culprits behind breakouts and blackheads.

❖ Do silicones cause irritation?

Silicones don't irritate the skin. They actually lower or eliminate irritation because they enhance the spreading and levelling of ingredients during application. This in-turn prevents pocketing and minimizes percentages of potentially irritating forms of cosmetic and drug ingredients. These include alpha hydroxy acids (AHAs), salicylic acid, strong emulsifiers and surfactants, benzoyl peroxide and organic sunscreens.



❖ Are silicones allergens?

Silicones are too large to enter the skin and react with the immune system, so they can't trigger an allergic reaction. In fact, they're so biologically inert when in contact with the skin, silicones are now replacing latex, a common allergen in adhesives, gloves and a wide array of other items. Silicones are also used on open wounds because they shorten healing time and do not promote bacterial growth. Silicones have been dermatologically tested with no allergic reactions. They can be claimed as hypoallergenic which is not the case of most natural oils.

❖ Do silicones buildup on hair and is difficult to remove?

Silicone deposition levels and the impact on hair volume depend upon the product and quantity used. In any event, where silicone deposits are suspected, they can be easily removed after one application of a clarifying shampoo.

❖ Do silicones contribute to sustainable development?

Yes, in fact silicones play an extremely important role in promoting sustainable development since they enhance the performance of products and appliances. Silicone allows other materials to last longer, spread better, stay flexible or rigid, and withstand extreme temperatures or electricity. **These are qualities that reduce resource consumption (saving energy) while making life safer**, more interesting and more comfortable. In fact, silicones in products save on average 9 times more CO₂ than what is emitted during their production, use and disposal.

❖ Is D4 forbidden in Personal Care applications?

Cyclotetrasiloxane (D4) is classified in the EU as a reprotoxic substance, category 2. D4 is in the meantime in Europe on Annex II List of substances prohibited in cosmetic products of cosmetic directive 1223/2009. Only technically unavoidable amounts are allowed in cosmetic products. BRB is continuously improving its products to lower the D4 remaining impurities levels to a maximum accepted limit of 0,1%. However, D4 is still widely used in Personal Care applications outside Europe.

Summary:

Silicones are often one of the main ingredients in "oil-free" products such as anti-acne treatments, sensitive hypo-allergenic skin lines, scar treatments, healthcare and medical devices, therefore applied to skin at its most sensitive. The reason? Silicones are chemically inert and never irritate or cause any allergic reaction on the skin. They are not occlusive, so they permit the skin to breath and they do not close pores. This breathable character protects skin from urban, external aggressions and permit skin to regenerate.