Nouryon

Dermacryl® X polymer

Film-forming polymer offering water and rub-off resistance for reliable high SPF systems

INCI: Acrylates Copolymer

Our line of Dermacryl polymers offer formulators the ability to create efficacious sun care formulations to suit a consumer's varied needs. From water-resistant products for use at the beach, to daily-wear moisturizers, today's sun care products demand both superior function and appealing aesthetics.

Dermacryl X provides water and rub-off resistance for reliable high SPF systems with pleasing aesthetics in both inorganic and organic systems delivered from an emulsion base. This polymer also requires no heat or neutralization and can be easily incorporated into emulsion-based sunscreens to help simplify the formulation process.

Recommended applications

- High performance sport SPF 50+ lotions
- Mineral sunscreen formulations
- Daily wear moisturizer with SPF
- Color cosmetics
- Face, body, hand and foot creams and lotions

Features and benefits

Features	Benefits
Film-formation	Proven water resistance and SPF retention at low use levels Resistant to rub off
Aesthetics	Lightweight feel during and after application
Low viscosity, polymer emulsion	Easy to incorporate into emulsion sunscreens and low viscosity pump spray formulations
Globally approved	Useful in a wide range of systems Suitable for use in all regions

Suggested use levels, as supplied

Application	% active
Sun protection	2.22-5.0
SPF daily wear moisturizer	2.22-3.0
Tinted sunscreens	2.22-5.0
Color cosmetics	1.0-20.0
Creams and lotions	1.0-5.0

Suggested pH range of final formulation: 5-8.

Compatibility

Sunscreen actives

Dermacryl X film-forming polymer performs well in the typical sunscreen formulations and has excellent compatibility with commonly used sunscreen actives, including Ethylhexyl Salicylate (Octisalate), Homosalate, Octocrylene, Avobenzone, Ethylhexyl Methoxycinnamate (Octinoxate), Benzophenone-3 (Oxybenzone), Titanium Dioxide and Zinc Oxide.

Other

Dermacryl X film-forming polymer is also compatible with a wide range of commonly used cosmetic ingredients: Carbomer, Xanthan Gum, Acrylates/C10-30 Alkyl Acrylate Crosspolymer, and other frequently used thickeners and polymeric emulsifiers.

It is recommended that Dermacryl X polymer be incorporated after emulsification and neutralization has taken place when formulations include Acrylates/C10-30 Alkyl Acrylate Crosspolymer at levels above 0.3%.

Formulation guidelines

Supplied as a low viscosity liquid aqueous emulsion, Dermacryl X film-forming polymer is easily dispersed in the water phase of oil-in-water emulsions and is easy to work with in lab and large-scale manufacturing settings. Dermacryl X polymer can either be added into the water phase prior to forming the emulsion or post added after the emulsion is formed.

It requires no heat or neutralization and can be used in either hot or cold emulsification processes. The material can be used at typical sunscreen formulation pH ranging from pH = 5 to 8.

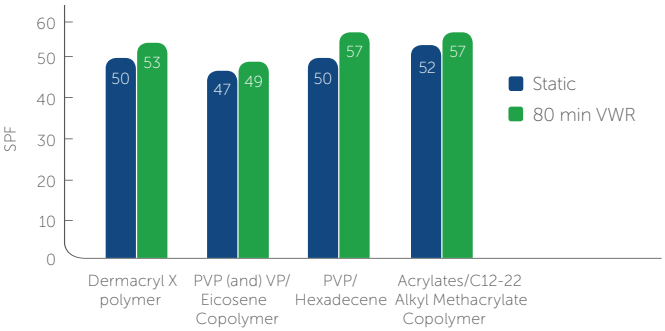
Lasting protection

Consumers demand high performance sun care products that will stay on in all environments, especially by the pool or at the beach. Dermacryl polymers make lasting protection simple.

Dermacryl X polymer provides effective and lasting film formation, enabling the formulation of reliable, high SPF systems. This polymer is well suited for high performance products that depend on excellent durability in both rub and global water resistance test methods.

Dermacryl X vs competitive benchmarks

In-vivo water resistance
FDA method, 5 panelist screener



North American Base SPF 50 2823-14

	Ingredient	Wt %
Phase A	Deionized Water	QS
	Dissolvine® NA2-S chelate	0.10
	Propylene Glycol	2.00
	Phenoxyethanol (and) Ethylhexylglycerin	1.00
	Acrylates/C10-30 Alkyl Acrylate Crosspolymer	0.40
Phase B	Avobenzone	3.00
	Homosalate	13.00
	Ethylhexyl Salicylate	5.00
	Octocrylene	8.00
	Glyceryl Stearate (and) PEG-100 Stearate	2.50
	C12-15 Alkyl Benzoate	5.00
	Dimethicone	2.00
	Polymer D, E	See note
Phase C	Triethanolamine-99%	0.60
	Deionized Water	4.00
Phase D	Polymer A, B, C, F	See note
Phase E	50% Citric Acid Solution	0.13

Polymer A: Dermacryl X polymer, 1% active
Polymer B: Dermacryl E polymer, 1% active
Polymer C: Dermacryl AQF polymer, 1% active
Polymer D: PVP (and) VP/Eicosene Copolymer, 1% active
Polymer E: PVP/Hexadecene Copolymer, 1% active
Polymer F: Acrylates/C12-22 Alkyl Methacrylate Copolymer, 1% active

Rub resistance

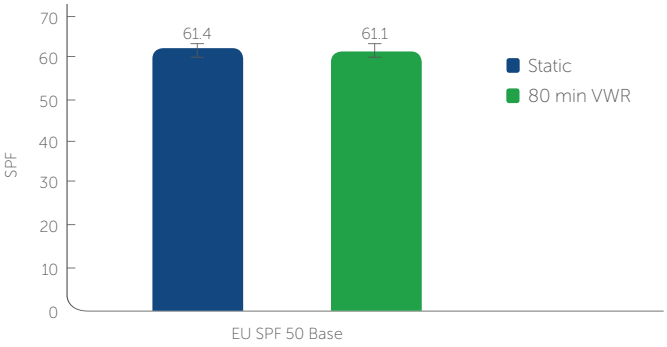
A weighted bar is pulled across a sunscreen film of North American Base SPF 50 2823-14 dried on a glass plate. The weight of film is taken before and after the bar is pulled to calculate percent substantivity.

Polymer in formulation	Average % substantivity
Dermacryl X polymer	82.71
Dermacryl E polymer	84.97
PVP (and) VP/Eicosene Copolymer	68.01
Acrylates/C12-22 Alkyl Methacrylate Copolymer	62.80
PVP/Hexadecene Copolymer	55.25

Dermacryl X in EU base SPF 50 system

In-vivo water resistance

5 panelist screener ISO 24444:2010 and COLIPA guidelines



EU Base SPF 50 2823-31

	Ingredient	Wt %
Phase A	Deionized Water	QS
	Dissolvine® NA2-S chelate	0.20
	Glycerin	5.00
	Amaze™ XT polymer	0.15
	Acrylates/C10-30 Alkyl Acrylate Crosspolymer	0.40
Phase B	Homosalate	6.00
	Avobenzone	5.00
	Ethylhexyl Salicylate	5.00
	Phenylbenzimidazole Sulfonic Acid	3.00
	C12-15 Alkyl Benzoate	5.00
	Carnauba Wax	0.50
	Sodium Stearoyl Glutamate	0.20
	Hydrogenated Coco-Glycerides	0.50
Phase C	Sodium Hydroxide 25% solution	0.60
	Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine (and) Acrylates/ C12-22 Alkyl Methacrylate Copolymer	9.00
Phase D	Dermacryl X polymer	2.22
	Phenoxyethanol (and) Ethylhexylglycerin	1.00

Consumer preferred aesthetics and formulations

As sun protection awareness increases, consumers are more likely to incorporate sunscreen into their daily routines. To be effective, these products must perform but have great aesthetic properties and skin feel.

Dermacryl X polymer offers strong performance without compromising on aesthetics, allowing formulators to create products that are effective but feel pleasant during and after application.

Polymers compared to Base formulation SPF 50 2823-14	Spreadability	Slip	Amount of residue	Greasiness	Oiliness	Stickiness	Prefer
Dermacryl X	=	=	=	=	=	=	=
Blank, no polymer	=	=	=	=	=	=	=
Dermacryl X	=	=	=	+	=	=	=
PVP (and) VP/Eicosene Copolymer	=	=	=	-	=	=	=
Dermacryl X	=	=	+	=	+	+	+
Acrylates/C12-22 Alkyl Methacrylate Copolymer	=	=	-	=	-	-	-
Dermacryl X	=	=	=	=	=	=	=
PVP/Hexadecene Copolymer	=	=	=	=	=	=	=

A "plus" means that the product performed more favourably in that category, i.e. a "+" in stickiness means the formula tested less sticky.
Comparison sensory test with 8 evaluations. 7-8 out of 8 is statistically superior, 2-7 out of 8 demonstrates no statistical difference, 0-1 or of 8 is statistically inferior.

Storage and handling

Dermacryl X polymer should be protected from freezing. Avoid extreme temperatures during storage. Good industrial hygiene practices should be followed when working with this polymer. Please read the SDS before working with this or any other chemical.

Please read the MSDS before working with this or any other chemical.

This product is best used within 12 months of manufacture.

Health and safety

A health and safety summary related for Dermacryl X polymer is available on request. Information on Dermacryl X polymer relating to EU Cosmetic Directive 76/768/EEC is also available upon request.

The suitability of the final formulations should be confirmed in all respects by appropriate evaluation. The marketer is advised to evaluate the final formulation with regard to performance and health and safety.

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Nouryon

Nouryon is a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Furthermore, the dedication of more than 7,900 employees with a shared commitment to our customers, business growth, safety, sustainability and innovation has resulted in a consistently strong financial performance. We operate in over 80 countries around the world with a portfolio of industry-leading brands. Visit our website and follow us @Nouryon and on LinkedIn.

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