



DOW

SunSpheres™ BIO SPF Booster

Formulations



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SUN#BEACH#SPF50+ — CPF 4300
Oil-in-Water Sun Cream

At the present time, this prototype formulation is not approved against regulatory requirements that permit compliant use in North America, and therefore not available for sale in the North America Region.

SUN#BEACH#SPF50+ — CPF 4300

Oil-in-Water Sun Cream

Phase	Trade name / Supplier	INCI name	Wt %
A	Water	Water	52.90
	SunSpheres™ BIO SPF Booster / Dow	Microcrystalline Cellulose	2.00
	Zemea / DuPont	1,3-Propanediol	2.25
	VERSENE™ NA₂ Crystals / Dow	Disodium EDTA	0.10
	ACULYN™ 38 Rheology Modifier / Dow	Acrylates / Vinyl Neodecanoate Crosspolymer	2.00
B	Neo Heliopan HMS / Symrise	Homosalate	5.00
	Neo Heliopan 357 / Symrise	Butyl Methoxydibenzoylmethane	4.00
	Tinosorb S / BASF	Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine	3.00
	Neo Heliopan OS / Symrise	Ethylhexyl Salicylate	4.00
	Uvinul T 150 / BASF	Ethylhexyl Triazone	2.00
	Crodamol AB / Croda	C12-15 Alkyl Benzoate	9.00
	Cetiol B / BASF	Dibutyl Adipate	2.25
	XIAMETER™ PMX-200 Silicone Fluid, 2 cSt / Dow	Dimethicone	2.00
	DOWSIL™ FZ-3196 Fluid / Dow	Caprylyl Methicone	2.00
C	Cutina GMS-SE / BASF	Glyceryl Stearate SE	4.00
	Sodium Hydroxide, 10% sol.	Sodium Hydroxide	qs
	EPITEX™ 99 Polymer / Dow	Acrylates Copolymer (and) Acrylates/ Polytrimethylsiloxymethacrylate Copolymer	2.50
	Neolone PH 100 Preservative / DuPont	Phenoxyethanol	1.00

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Processing instructions:

1. Disperse SunSpheres™ BIO SPF Booster in water and mix until dispersed/no clumps (~20 minutes). While mixing, add the phase A ingredients in order listed until homogeneous, then start heating to 75°C.
2. Mix sunscreen ingredients of phase B together and start heating to 80-85°C for 5-10 minutes then add remainder of phase B ingredients one by one. Mix at 70-75°C until all ingredients are melted/dissolved.
3. Add phase B to phase A mixing moderate speed until uniform.
4. Add phase C ingredient if needed (pH target 6.5-7) and start cooling.
5. When T° <40°C, add phase D, then E and mix well (for 2 min at 2000 rpm).
6. Adjust pH to 6.5-7 if needed.

Stability: Stable at least 2 months at RT and at least 1 month at 40°C.

Appearance: Slightly yellow cream

Viscosity: 20,000 cSt

pH: 6.0-7.0



SUN#DAILY#SPF30 — CPF 4301
Oil-in-Water Sun Cream

SUN#DAILY#SPF30 — CPF 4301

Oil-in-Water Sun Cream

Phase	Trade name / Supplier	INCI name	Wt %
A	Water	Water / Aqua	60.75
	SunSpheres™ BIO SPF Booster / Dow	Microcrystalline Cellulose	1.50
	EcoSmooth™ Universal Fluid 75-H-450 / Dow	PEG/PPG-17/6 Crosspolymer	0.50
	Butylene Glycol	Butylene Glycol	2.00
	VERSENE™ NA Crystals Chelating Agent / Dow	Disodium EDTA	0.10
	SymSave H / Symrise	Hydroxyacetophenone	0.50
B	ACULYN™ 38 Rheology Modifier / Dow	Acrylates / Vinyl Neodecanoate Crosspolymer	3.00
	Procol CS20D / Making Cosmetics	Cetearyl Alcohol (and) Ceteareth-20	1.75
	Arlacel 165 / Spectrum	Glyceryl Stearate (and) PEG-100 Stearate	2.00
	CCT / Spectrum	Caprylic/Capric Triglyceride	5.00
	C12-15 Alkyl Benzoate / Making Cosmetics	C12-15 Alkyl Benzoate	5.00
	Parsol HMS / DSM	Homosalate	5.00
	Parsol EHS / DSM	Octisalate / Ethylhexyl Salicylate	5.00
	Parsol 1789 / DSM	Avobenzene / Butyl Methoxydibenzoylmethane	3.00
C	Parsol 340 / DSM	Octocrylene	4.00
	TEA, 99% / Dow	Triethanolamine	0.40
D	Neolone PH 100 Preservative / DuPont	Phenoxyethanol	0.50

Processing instructions:

1. Add SunSpheres™ BIO SPF Booster to water and mix until dispersed/no clumps (~30 minutes). Then start heating to 70-75°C and continue mixing. Add Symsav H, Butylene Glycol, EcoSmooth™ Universal Fluid 75-H-450, VERSENE™ NA, Crystals Chelating Agent, followed by ACULYN™ 38 Rheology Modifier. Continue mixing and heating to 70-75°C.
2. Mix sunscreen ingredients of phase B together and start heating to 70-75°C. Continue mixing/heating until Avobenzene dissolves, then add remainder of phase B ingredients. Mix at 70-75°C until all ingredients are melted/dissolved.
3. With phase B @ 70°C add to phase A (70-75°C) and mix well for 5 min.
4. Homogenize at 10,000 rpm for 3 min. After 2 min, add half of phase C (TEA) and continue to homogenize.
5. Switch back to standard mixing and add the other half of phase C. When batch reaches 45°C, add phase D and continue mixing until batch reaches 25°C. Adjust pH to 6.0-7.0 with phase C if necessary.

Appearance: White cream

Viscosity: 60,000-80,000 cPs

pH: 6.0-7.0

In vivo SPF 37

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SUN#PLAYTIME#SPF30 — CPF 4302
Oil-in-Water Sun Cream

SUN#PLAYTIME#SPF30 – CPF 4302

Oil-in-Water Sun Cream

Phase	Trade name / Supplier	INCI name	Wt %
A	Water	Water / Aqua	55.32
	SunSpheres™ BIO SPF Booster / Dow	Microcrystalline Cellulose	1.50
	VERSENE™ NA ₂ Crystals Chelating Agent / Dow	Disodium EDTA	0.05
	Propylene Glycol	Propylene Glycol	1.00
	Methyl Gluceth-10 / Making Cosmetics	Methyl Gluceth-10	1.00
	Keltrol CGT / CP Kelco	Xanthan Gum	0.50
B	PEG-40 Stearate / Making Cosmetics	PEG-40 Stearate	1.00
	Glyceryl Stearate / Making Cosmetics	Glyceryl Stearate	1.00
	Procol CS20D / Making Cosmetics	Cetearyl Alcohol (and) Cetareth-20	3.00
	C12-15 Alkyl Benzoate / Making Cosmetics	C12-15 Alkyl Benzoate	7.00
	XIAMETER™ PMX-200 Silicone Fluid, 5 cSt / Dow	Dimethicone	4.00
	HallBrite BHB / HallStar	Butyloctyl Salicylate	5.00
	CCT / Spectrum	Caprylic/Capric Triglyceride	2.00
	ZnO-C-NJE3 / Kobo	Zinc Oxide, Jojoba Esters	7.00
	MT-500B-NJE5 / Kobo	Titanium Dioxide, Jojoba Esters	9.00
C	Pelemol PHS-8 / Phoenix Chemical	Polyhydroxystearic Acid	0.50
	TEA, 99% / Dow	Triethanolamine	0.13
D	Phenoxyethanol SA / Making Cosmetics	Phenoxyethanol (and) Caprylyl Glycol	1.00

Processing instructions:

1. Add SunSpheres™ BIO SPF Booster to water, mixing at RT until dispersed/ no clumps ~20 min, then add rest of the water phase ingredients mixing well between additions. Begin heating to 70-75°C with good mixing.
2. In separate vessel begin adding ingredients of phase B one at a time. Start mixing with overhead mixer. At ~65°C homogenize for 3 min.
3. Once both phases are at 70-75°C, add phase B to phase A and mix well ~5 min. Move to homogenizer (no heat) and homogenize 2-3 min.
4. Move back to overhead mixing and allow to cool to ~45°C.
5. Add TEA to adjust pH to 8.
6. Add phase D and mix until uniform.

Appearance: White cream

Viscosity: 50,000-60,000 cPs

pH: 7.5-8.0

In vivo SPF 35

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SUN#CITY#SPF30 — CPF 4303

Water-in-Oil Sun Cream

SUN#CITY#SPF30 — CPF 4303

Water-in-Oil Sun Cream

Phase	Trade name / Supplier	INCI name	Wt %
A	DOWSIL™ ES-5600 Silicone Glycerol Emulsifier / Dow	Diglyceryl Tris (Trimethylsiloxy) Silyethyl Dimethicone	5.00
	Arlamol HD / Croda	Isohexadecane	1.00
	DOWSIL™ EL-9241 DM Silicone Elastomer Blend / Dow	Dimethicone (and) Dimethicone Crosspolymer	3.00
	Crodamol AB / Croda	C12-15 Alkyl Benzoate	3.00
	Zinc Oxide (and) Triethoxycaprylsilane	Zinc Oxide (and) Triethoxycaprylsilane	15.00
B	DOWSIL™ ES-5600 Silicone Glycerol Emulsifier / Dow	Diglyceryl Tris (Trimethylsiloxy) Silyethyl Dimethicone	1.50
	DOWSIL™ FZ-3196 Fluid / Dow	Caprylyl Methicone	7.50
	SunSpheres™ BIO SPF Booster / Dow	Microcrystalline Cellulose	2.00
	A40-TiO ₂ -DS7 / Kobo	Titanium Dioxide (and) Alumina (and) Dimethicone	6.00
C	Glycerin	Glycerin	5.00
	Water	Water	50.00
	Euxyl PE 9010 / Schulke	Phenoxyethanol (and) Ethylhexylglycerin	1.00

Processing instructions:

1. Mix phase A ingredients in order.
2. Mix phase B ingredients in order and add to phase A under agitation (700 rpm).
3. Premix phase C ingredients and add to phase AB under agitation (700 rpm).
4. Mix for 5 min at 2000 rpm.
5. Add TEA to adjust pH to 7.3 if needed.
6. Pass to high shear if needed.

Appearance: White cream

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SUN#GLAMOUR#SPF15 — CPF 4315

Water-in-Oil BB Cream

SUN#GLAMOUR#SPF15 – CPF 4315

Water-in-Oil BB Cream

Phase	Trade name / Supplier	INCI name	Wt %
A	DOWSIL™ FA 4004 ID Silicone Acrylate / Dow	Isododecane (and) Acrylates/ Polytrimethylsiloxymethacrylate Copolymer	5.00
	Crodamol AB / Witco Corporation	C12-15 Alkyl Benzoate	2.00
	Avocado Oil	Persea Gratissima (Avocado) Oil	1.00
	Isododecane / Making Cosmetics	Isododecane	4.00
	DOWSIL™ EL-9240 Silicone Elastomer Blend / Dow	Dimethicone (and) Dimethicone Crosspolymer	5.00
	DOWSIL™ FZ-3196 Fluid / Dow	Caprylyl Methicone	2.00
	DOWSIL™ ES-5600 Silicone Glycerol Emulsifier / Dow	Diglyceryl Tris(Trimethylsiloxy)silylethyl Dimethicone	6.50
B	ACT96-TRI-77891 / Miyoshi America, Inc.	CI 77891 (and) Disodium Stearoyl Glutamate (and) Aluminum Dimyristate (and) Triethoxycaprylsilane	2.00
	ACT96-Y-77492 / Miyoshi America, Inc.	CI 77492 (and) Disodium Stearoyl Glutamate (and) Aluminum Dimyristate (and) Triethoxycaprylsilane	1.00
	ACT96-R-77491 / Miyoshi America, Inc.	CI 77491 (and) Disodium Stearoyl Glutamate (and) Aluminum Dimyristate (and) Triethoxycaprylsilane	0.20
	ACT96-B-77499 / Miyoshi America, Inc.	CI 77499 (and) Disodium Stearoyl Glutamate (and) Aluminum Dimyristate (and) Triethoxycaprylsilane	0.05
	Parsol TX / DSM	Titanium Dioxide	8.00
	Water	Water	55.75
C	SunSpheres™ BIO SPF Booster / Dow	Microcrystalline Cellulose	2.00
	GLC 99% / Fisher Scientific	Glycerin	5.00
	DOWANOL EPH Glycol Ether / Azelis	Phenoxyethanol	0.50

Processing instructions:

1. Mix phase A together until homogenous.
2. Mix phase B using a speed mixer until powders are homogenous.
3. Mix phase C together, heat to 40°C. Batch should thicken at this point.
4. Add phase B to phase A.
5. Add phase C to phases A+B slowly with turbulent agitation.
6. Homogenize final product.

Appearance: Brown

Viscosity: 10,000-12,000 cPs

pH: 6.5-7.5

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