

Confidential

Formulations
of
Vitamin E Phosphate
(Sodium Tocopheryl Phosphate:
TPNa)



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Ver0703



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Solubility in Alcohols

Solubility in water, alcohol, or polyhydric alcohols

Solvent	Solubility (25°C)	
	TPNa conc.:	
	2 %	25 %
water	S	P
ethanol	I	I
propylene glycol	S	S
1,3-butylene glycol	I	I
1,2-pentandiol	S	S
1,2-hexandiol	S	S
dipropylene glycol	I	I
glycerol	S	S

S Soluble P Partly soluble, slightly turbid I Insoluble, turbid

Vitamin E phosphate (TPNa) is soluble in water at 2% or more, up to about 10%. It is well soluble in propylene glycol, 1,2-pentandiol, 1,2-hexandiol, and glycerol.

Solubility in 6% alcohol, or polyhydric alcohols

Solvent	Solubility at 2%		pH
	Temperature:		
	5°C	25°C	
water	S	S	9.1
6% ethanol	I	S	8.9
6% propylene glycol	S	S	9.0
6% 1,3-butylene glycol	S	S	8.9
6% 1,2-pentandiol	S	S	8.4
6% 1,2-hexandiol	S	S	7.8
6% dipropylene glycol	S	S	8.8
6% glycerol	S	S	9.0
6% diglycerol	I	S	9.0

S Soluble I Insoluble, turbid

2% Vitamin E phosphate (TPNa) is soluble in aqueous solutions containing above listed organic solvents at 6% at room temperature, however, sediment was observed with ethanol and diglycerol at low temperature (5°C). pH values of the solutions are around 9, except for ones with 1,2-pentandiol or 1,2-hexandiol: pH values drops down to around 8.

V1010-1.2.0E



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Vanishing Cream

Cream VEC01-002		
	(INCI name)	(%)
1	stearic acid	3.2
2	behenyl alcohol	3.2
3	polyglyceryl-10 isostearate	1.6
4	isopropyl palmitate	4.8
5	squalane	6.4
6	octyldodecanol	4.8
7	dimethicone	0.4
8	methylparaben	0.2
9	propylparaben	0.1
10	sodium tocopheryl phosphate	2.0
11	butylene glycol	4.8
12	glycerin	4.8
13	potassium hydroxide (10% aq.)	1.6
14	pure water	62.1
	total	100
	pH	7.4

Preparation

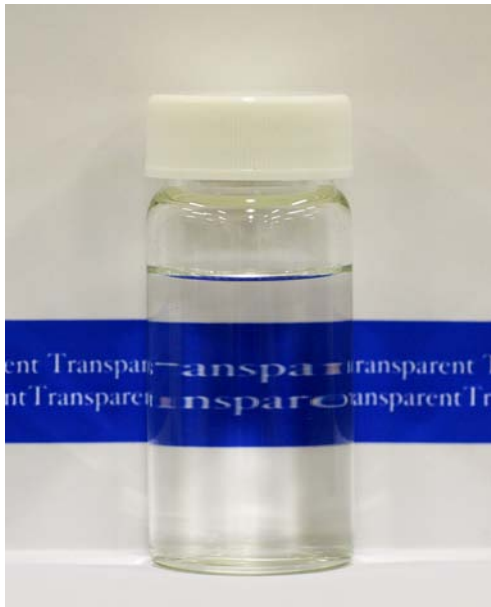
- 1) Mix ingredients 1-9 at 85°C (Phase A).
- 2) Mix ingredients 10-14 at 85°C (Phase B).
- 3) Add Phase B to Phase A slowly and emulsify with a homomixer.
- 4) Allow to stand under ambient condition till 60°C, then start cooling.
- 5) Keep mixing till 30°C.

Cream VEC01-001/-007/-008					
(INCI name)		(%)			
		01-001	-007	-008	
A	1	hydrogenated rape seed alcohol	4.2	4.2	4.2
	2	isononyl isononanoate	6.0	6.0	6.0
	3	squalane	9.6	9.6	9.6
	4	octyldodecyl myristate	4.8	4.8	4.8
	5	polyglyceryl-10 stearate	2.0	-	-
	6	PEG-24 glyceryl stearate	-	2.0	2.0
	7	glyceryl stearate	1.0	1.5	-
	8	sorbitan sesquioleate	-	-	1.5
	9	methylparaben	0.1	0.1	0.1
	10	propylparaben	0.05	0.05	0.05
	11	xanthan gum	0.1	0.1	0.1
B	12	butylene glycol	4.8	4.8	4.8
	13	glycerin	4.8	4.8	4.8
	14	sodium tocopheryl phosphate	2.0	2.0	2.0
	15	sodium citrate	0.4	0.4	0.4
	16	pure water	60.15	59.65	59.65
total			100	100	100
pH			8.2	8.1	8.1

Preparation

- 1) Mix ingredients 1-11 at 85°C (Phase A).
- 2) Mix ingredients 12-16 at 85°C (Phase B).
- 3) Add Phase B to Phase A slowly and emulsify with a homomixer.
- 4) Allow to stand under ambient condition till 60°C, then start cooling.
- 5) Keep mixing till 30°C.

Lotion VEL08-004		
	(INCI name)	(%)
1	sodium tocopheryl phosphate	2.0
2	glycerin	4.0
3	propylene glycol	6.0
4	ethanol	3.0
5	phenoxyethanol	0.1
6	dipotassium hydrogen phosphate	3.5
7	tetrasodium EDTA	0.2
8	PEG-50 hydrogenated castor oil	0.5
9	pure water	80.7
total		100
pH		8.5



Preparation

- 1) Mix ingredients 1-5 and disperse TPNa in it.
- 2) Add water to dissolve TPNa.
- 3) Add remaining ingredients. Mix well.



Transparent Lotion 2 (Serum)

Lotion VEL09-001/-003/-004				
	(INCI name)	(%)		
		09-001	-003	-004
1	sodium tocopheryl phosphate	2.0	2.0	2.0
2	glycerin	4.0	4.0	4.0
3	citric acid (1% aq.)	3.0	7.0	8.0
4	1,2-pentandiol	3.0	3.0	3.0
5	methylparaben	0.2	0.2	0.2
6	pure water	87.8	83.8	82.8
total		100	100	100
pH		7.9	6.8	6.4



Preparation

- 1) Mix ingredients 1,2, and 4. Disperse TPNa in it.
- 2) Add water to dissolve TPNa.
- 3) Add remaining ingredients. Mix well.

			(INCI Name)	(%)
A	1	cetearyl alcohol		1.0
	2	glyceryl stearate		3.0
	3	squalane		5.0
	4	cyclomethicone		2.0
	5	triethylhexanoin		1.0
	6	ethylhexyl palmitate		1.5
	7	propylparaben		0.1
B	8	sodium tocopheryl phosphate		2.0
	9	glycerol		5.0
	10	dipropylene glycol		3.0
	11	pentylene glycol		2.0
	12	carbomer		0.2
	13	methylparaben		0.2
	14	water		68.8
C	15	arginine		0.2
	16	water		5.0
			total	100

Preparation

- 1) Mix ingredients 1-7 at 75°C (A).
- 2) Dissolve ingredients 8-13 in water at 75°C (B).
- 3) Add A to B maintaining temperature at 75°C.
- 4) Emulsify with homomixer.
- 5) Add C and allow to cool down to 35°C under mixing.



Notes for Formulation

1) Sodium Vitamin E Phosphate (sodium tocopheryl phosphate, TPNa) is a phosphoric ester compound. It makes water-insoluble salt with divalent cations. It is recommended not to formulate TPNa with salts of calcium, magnesium, or the ingredients containing such divalent cations. If such a formulation is unavoidable, it is recommended to use an appropriate amount of sequestering agents.

2) TPNa may be hydrolyzed by a phosphoric ester hydrolytic enzyme. It is important to confirm that TPNa is not hydrolyzed with combined ingredients of natural origins, as may contain phosphatases.

<Additional Notes>

Each formulation and data given in this formulary is based on experimental results, however, each shows just an example and we will not guaranty a reproducibility of the results. The formulations given in this formulary can be applied to customer's product development, however, we will not guaranty the stability and safety of customer's finished product. In your formulation, please consider proper addition of antioxidant, antiseptics, preservatives, sequestering agent, aromatics, etc. We will never assume responsibility for any liability or damage, which may arise directly or indirectly in connection with the use of such formulations. We have no concern with a presence of intellectual property right for other company's raw materials in the formulations. Therefore you are strongly suggested to be extra careful for the presence of intellectual property right for each raw material in your use.

V1100-1.1.0E