

The best emulsifier, solubilizer for formulations high in oil

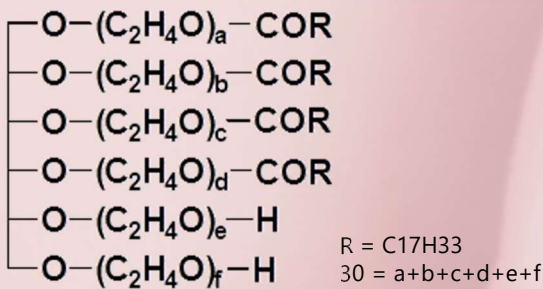
# RHEODOL 430V

Selecting the best emulsifier combination is technically difficult, in particular for cosmetic formulations containing a lot of oil such as cleansing oil (makeup remover). RHEODOL 430V allows product development to be easy by its property of high compatibility with many types of oils.

Emulsifying,  
solubilizing  
property

Simple, easy  
formulation

INCI SORBETH-30 TETRAOLEATE  
Active matter : 100%



Nonionic surfactant      HLB 10.5  
China IECIC\*: yes      \*Inventory of Existing Cosmetic Ingredients in China

## APPLICATION examples

- Cleansing oil (makeup remover)
- Skincare cream
- Hair cream

## MAIN FEATURES

1. Great formulation flexibility due to excellent emulsifying performance against various types of oil.
2. Makes fine uniform emulsion
3. Safe and not irritant

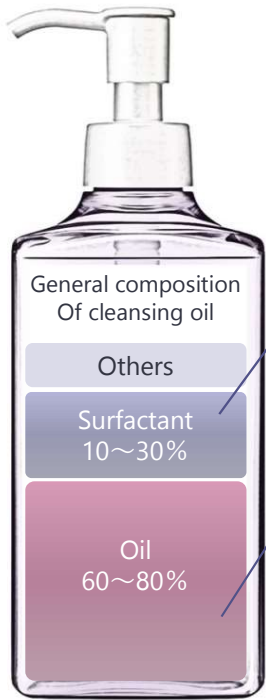
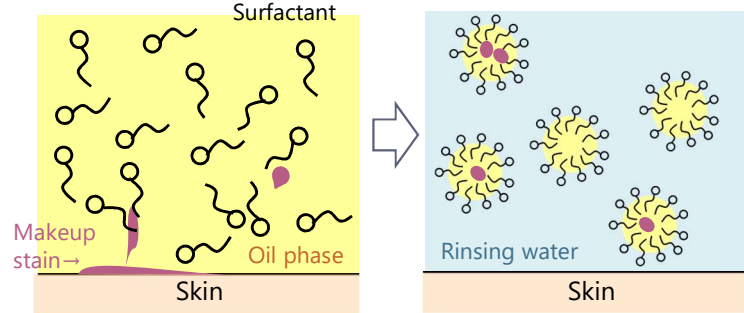
# RHEODOL 430V has excellent emulsifying property, Ideal ingredient for cleansing oil makeup remover.

## Key Factors of Cleansing Oil

Cleansing oil removes dirt by dissolving makeup stains into oil and dispersing them in water by using surfactant property. During this process, emulsion phase changes from water-in-oil to oil-in-water.

Selection of oil is significant as it affects cleansing performance and texture to skin. It also characterizes product concept such as mildness and natural image.

Main role of surfactant is phase inversion, therefore choice of surfactant affects rinsing ability.



### Influential Factors

- Rinsing: Efficiency of phase inversion
- Stability against turbidity: Compatibility with oil  
⇒ Emulsification and solubilization performance

- Detergency: Affinity to makeup stains
- Feeling: Viscosity, composition of oil, etc.
- Stability in low-temperature: Melting point of oil

Surfactants typically used	HLB
Sorbeth-30 Tetraoleate	10.5
PEG-8 Glycerol Isostearate	12.9
PEG-12 Laurate	13.7
Polyglyceryl-2 Isostearate	8.0

Oil type	Oils typically used
Hydrocarbons <b>Non-polar</b>	Mineral oil (Liquid paraffin), Isododecane
Ester oils <b>Polar</b>	Cetyl Ethylhexanoate, Caprylic/Capric Triglyceride, Isopropyl Isostearate
Vegetable oil <b>Polar</b>	Olive oil, Rice bran oil
Silicones	Cyclopentasiloxane, Dimethicone

## Features of oils

### Non-polar oils *e.g.* hydrocarbons

- + Widely used. Bring high detergency and refresh feel when rinsing.
- Viscosity of cleansing oil with non-polar oils tends to be lower in general, normally formulated with ester oil to adjust it.

Suitable concept  
⇒ For waterproof makeup, feel fresh

### Polar oils *e.g.* vegetable oil

- + Compatible and gentle to skin since triglyceride is similar structure to sebum. Even if oil remains on skin after washing, it works as a moisturizing ingredient. Recently becoming common with botanical concept.
- Difficult to be stabilized in cleansing oil formula.

Suitable concept  
⇒ Gentle to skin, organic, botanical

### Silicones

- + Often used to improve compatibility with makeup components which generally contain silicone-treated powders or polymers.
- Difficult to be stabilized in cleansing oil formula.

# Emulsifying property

## - Combination with various oil

Great formulation flexibility due to excellent emulsifying performance against various types of oil.

### Compatibility: Surfactant and Oil - single

Surfactant and oil which are typically used in cleansing oil had been mixed (ratio=1:9 or 2:8), and evaluated its appearance after stirring.

		RHEODOL 430V HLB: 10.5		PEG-8 Glyceryl Isostearate HLB: 12.9		PEG-12 Laurate HLB: 13.7		Polyglyceryl-2 Isostearate HLB: 8.0	
		1:9	2:8	1:9	2:8	1:9	2:8	1:9	2:8
Ester oils	Isopropyl isostearate	✓	✓	×	×	×	×	×	×
	Cetyl Ethylhexanoate	✓	✓	×	×	×	×	×	×
Hydrocarbons	Isododecane	✓	✓	×	✓	×	×	×	×
	Liquid paraffin	✓	✓	×	✓	×	×	×	×
Triglycerides	Olive oil	✓	✓	✓	✓	×	×	×	×
	Rice bran oil	✓	✓	✓	✓	×	×	×	×

Selecting surfactants / emulsifiers is not easy. It is necessary to find optimal HLB range based on oil or oil blend (object to be emulsified), to choose suitable agents. It is known that combination of emulsifiers with different HLB enhances emulsification. However, even if the best combination is discovered, readjustment might be required when oil component is changed.

- The figure on the left shows appearance of samples; various oils and surfactants mixed in two different ratios. RHEODOL 430V is capable of transparently dissolving various oils with a single agent.
- RHEODOL 430V shows excellent compatibility especially with polar oils such as vegetable oils and in formula containing silicone (figure below).



RHEODOL 430V expands allowance, selectivity of oil based on various concepts, and possibility of product design.

### Compatibility: Surfactant and Oil - blend

Surfactant and oil blend had been mixed (ratio = 2:8), and evaluated its appearance after stirring. PEG-12 Laurate and Polyglyceryl-2 Isostearate had been combined to balance HLB as they are generally formulated in combination with other surfactant for cleansing oil.

Evaluation model	Composition	%   HLB	RHEODOL 430V 10.5	PEG-8 Glyceryl Isostearate 12.9	Ratio of combination <PEG-12 Laurate> : <Polyglyceryl-2 Isostearate>						
					13.70	11.99	11.42	10.85	10.50	10.28	9.71
1) Non-polar oil basis	Isododecane	40%	Clear	Clear	Turbid	←	Clear	←	←	Turbid	←
	Hydrogenated isobutene	20%									
	Cetyl Ethylhexanoate	10%									
	Olive oil	10%									
2) Polar oil basis	Olive oil	30%	Clear	Turbid	←	←	←	←	←	←	
	Caprylic/Capric Triglyceride	20%									
	Cetyl Ethylhexanoate	30%									
3) Polar oil basis + Cyclic silicone	Olive oil	30%	Clear	Turbid	←	←	←	←	←	←	
	Caprylic/Capric Triglyceride	25%									
	Cetyl Ethylhexanoate	20%									
	Cyclic silicone	5%									

# Botanical cleansing oil

#Mineral oil free #Silicone free # Ethanol free #Gentle to skin

Ingredient (active matter%)	INCI name	Wt %
A. Olive oil	Olea Europaea (Olive) Fruit Oil	55.0
B. COCONAD MT (100%)	Caprylic/Capric Triglyceride	30.0
C. RHEODOL 430V (100%)	Sorbeth-30 Tetraoleate	15.0

Olive oil gives natural image, and leaves skin hydrated.

RHEODOL 430V allows cleansing oil to be formulated only with polar oils.

# Cleansing oil for waterproof makeup

#Removable stubborn makeup #Not greasy

Ingredient	INCI name	Wt %
A. Isododecane	Isododecane	25.0
B. Hydrogenated Polyisobutene	Hydrogenated Polyisobutene	15.0
C. EXCEPARL HO (100%)	Cetyl Ethylhexanoate	10.0
D. COCONAD MT (100%)	Caprylic/Capric Triglyceride	29.5
E. RHEODOL 430V (100%)	Sorbeth-30 Tetraoleate	20.0
F. 1,3-BG	Butylene Glycol	0.5

Hydrocarbons improve cleaning property to melt off waterproof makeup.

MCT gives texture like spa treatment, ester oils enhance emulsification and firmly whisk dirt away with RHEODOL 430V.

# Cleansing Balm

#Massage

Ingredient	INCI name	Wt %
A. COCONAD MT (100%)	Caprylic/Capric Triglyceride	20.0
B. Olive oil	Olea Europaea (Olive) Fruit Oil	40.0
C. EXCEPARL HO (100%)	Cetyl Ethylhexanoate	7.0
D. Hydrogenated Polyisobutene	Hydrogenated Polyisobutene	5.0
E. RHEODOL 430V (100%)	Sorbeth-30 Tetraoleate	20.0
F. Polyethylene	Polyethylene	8.0

It is arranged oil cleansing formula with polyethylene (high melting point) as a solidifying agent.

Balm type can be used by massaging, it offers blood circulation promotion and relaxing effect.

## RHEODOL 400 series

	RHEODOL 430V	RHEODOL 440V	RHEODOL 460V
Composition	Polyoxyethylene(30) sorbitol tetraoleate	Polyoxyethylene(40) sorbitol tetraoleate	Polyoxyethylene(60) sorbitol tetraoleate
INCI name	SORBETH-30 TETRAOLEATE	SORBETH-40 TETRAOLEATE	SORBETH-60 TETRAOLEATE
HLB	10.5	11.8	13.8
Appearance	Clear Light Yellow Liquid	Clear Light Yellow Liquid	Light Yellow Paste
Melting point	-7.4°C	2.1°C	18.7°C
Package	17kg can, 180kg drum	17kg can	17kg can

## Kao Corporation

Address : 1-3, Bunka 2- chome, Sumida -ku, TOKYO 131- 8501 JAPAN

Telephone: +81 3 5630 7644

URL=<http://chemical.kao.com/global/>



Enriching lives,  
in harmony with nature.

The information and recommendation in this publication is to the best of our knowledge reliable. However, nothing herein is to be construed as a warranty or representation. Users should make their own tests to determine the applicability of such information or the suitability of any products for their own particular purpose. Statements concerning the use of the products described herein are not to be construed as recommending the infringement of any patent and no liability for infringement arising out of any such use is assumed.

The status including product specification, INCI names, applicable regulations is subject to change without notice due to possible changes in our product and national standard. Copying or reprinting the contents of this document without our permission is prohibited.

