

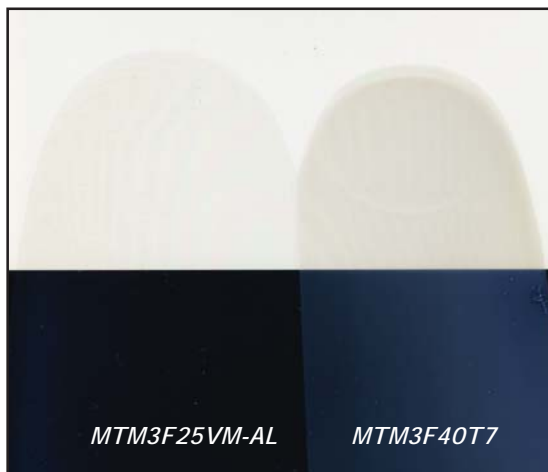
Attenuation Grade Volatile Non-D5 TiO₂ & ZnO Dispersions

There is a current trend in the market to move away from volatile cyclic silicone products, namely Cyclopentasiloxane. Kobo is a global leader in pigment dispersions including attenuation grade and pigmentary grade Titanium Dioxide, Zinc Oxide, Iron Oxides, and Organic Pigments. In addition to offering these pigments in cyclic silicones, several **Volatile Non-D5** options are available that have properties that are similar to cyclic silicones.

Based on many years of experience, Kobo has carefully selected carriers and dispersants that mimic the volatility of cyclic silicones. These dispersions continue to provide unprecedented transparency and highly effective protection throughout the UV region.

Kobo also specializes in creating custom dispersion formulations.

Carriers	INCI
DM2	Dimethicone (And) Trisiloxane
DM2MTM	Dimethicone (And) Trisiloxane (And) Methyl Trimethicone
DM5	Dimethicone
DMTM	Dimethicone (And) Methyl Trimethicone
MTM	Methyl Trimethicone
IDD	Isododecane
PM9P	Isododecane



Volatile Non-D5 Sunscreen

Formula KSL-156

Part 1

- **MTM3K50XZ4** - Kobo Products: *Zinc Oxide (And) Methyl Trimethicone (And) PEG-10 Dimethicone (And) Methicone* 43.90%
- **MTM3F40T7** - Kobo Products: *Methyl Trimethicone (And) Titanium Dioxide (And) Alumina (And) Hydrogen Dimethicone (And) Lauryl PEG-9 Polydimethylsiloxylethyl Dimethicone* 5.80%
- ABIL® WE 09 - Evonik: *Polyglyceryl-4 Isostearate (And) Cetyl PEG/PPG-10/1 Dimethicone (And) Hexyl Laurate* 5.00%
- Crill 3 NF - Croda: *Sorbitan Isostearate* 0.50%

Part 2

- Deionized Water: *Water* 38.80%
- Aculyn™ 44 - Rohm & Haas: *PEG-150/Decyl Alcohol/SMDI Copolymer* 3.50%
- Sodium Chloride - Morton Salt : *Sodium Chloride* 1.00%
- Germaben® II - ISP: *Propylene Glycol (And) Diazolidinyl Urea (And) Methylparaben (And) Propylparaben* 1.00%

SPF 28
PFA 8

- Polysorbate 20 - Ruger Chemical Co., Inc.: *Polysorbate 20* 0.50%

Manufacturing Procedure

1. In main kettle, combine Part 1 ingredients and heat to 60-65°C.
2. Mix Part 2 ingredients until uniform and add Part 1 under propeller. Mix until uniform. While at 65°C, homogenize for 2 minutes at 3500 rpm.
3. Cool to 28°C (room temperature) with water bath.

Description

This transparent, daily-use sunscreen uses Kobo's Volatile Non-D5 Dispersions, MTM3K50XZ4 and MTM3F40T7 to achieve both a D5-free sunscreen and an SPF 28/PFA 8.

Active Ingredients : Titanium Dioxide = 1.84%
Zinc Oxide = 21.10%



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Volatile Non-D5 Dispersions

	Product Name	INCI Name	Primary Part. Size	Particle Size*	Active Content	Viscosity
Titanium Dioxide	PM9P50VM-AL	Titanium Dioxide (And) Isododecane (And) Alumina (And) Methicone (And) Polyhydroxystearic Acid	10 nm	103 nm	39%	pourable
	MTM3F25VM-AL	Methyl Trimethicone (And) Titanium Dioxide (And) Alumina (And) Lauryl PEG-9 Polydimethylsiloxyethyl Dimethicone (And) Methicone	10 nm	115 nm	19%	pourable
	New DTFSF40VBAS	Titanium Dioxide (And) C12-15 Alkyl Benzoate (And) Methyl Trimethicone (And) Dimethicone (And) Trisiloxane (And) Caprylyl Methicone (And) Alumina (And) Triethoxysilyl ethyl Polydimethylsiloxyethyl Hexyl Dimethicone (And) PEG-9 Polydimethylsiloxyethyl Dimethicone (And) Polyhydroxystearic Acid	10 nm	130 nm	30%	pourable
	DM2F35VM-AL	Dimethicone (And) Trisiloxane (And) Titanium Dioxide (And) Alumina (And) Methicone (And) PEG-9 Polydimethylsiloxyethyl Dimethicone	10 nm	133 nm	27%	pourable
	PM9P50M170	Titanium Dioxide (And) Isododecane (And) Alumina (And) Methicone (And) Polyhydroxystearic Acid	14 nm	110 nm	40%	pourable
	DM2F40T7	Dimethicone (And) Trisiloxane (And) Titanium Dioxide (And) Alumina (And) Methicone (And) PEG-9 Polydimethylsiloxyethyl Dimethicone	15 nm	125 nm	32%	paste
	New CAP50M170	Titanium Dioxide (And) Coconut Alkanes (And) Alumina (And) Methicone (And) Polyhydroxystearic Acid	15 nm	125 nm	39.5%	pourable
	MTM3F40T7	Methyl Trimethicone (And) Titanium Dioxide (And) Alumina (And) Hydrogen Dimethicone (And) Lauryl PEG-9 Polydimethylsiloxyethyl Dimethicone	15 nm	128 nm	32%	pourable
	DMTMF40T7	Titanium Dioxide (And) Dimethicone (And) Methyl Trimethicone (And) PEG-9 Polydimethylsiloxyethyl Dimethicone (And) Alumina (And) Methicone	15 nm	163 nm	32%	pourable
	WEIDDF45TIS	Titanium Dioxide (And) Isododecane (And) Polyglyceryl-4 Isostearate (And) Cetyl PEG/PPG-10/1 Dimethicone (And) Hexyl Laurate (And) Aluminum Hydroxide (And) Isostearic Acid (And) PEG-9 Polydimethylsiloxyethyl Dimethicone	15 nm	164 nm	36%	paste
Zinc Oxide	DM2F50XZ4	Zinc Oxide (And) Dimethicone (And) Trisiloxane (And) Methicone (And) PEG-9 Polydimethylsiloxyethyl Dimethicone	20 nm	171 nm	48%	pourable
	DM565HP1	Zinc Oxide (And) Dimethicone (And) Lauryl PEG-9 Polydimethylsiloxyethyl Dimethicone (And) Triethoxycaprylylsilane	60-100 nm	227 nm	64%	paste
	DMTMF50XZ4	Zinc Oxide (And) Dimethicone (And) Methyl Trimethicone (And) PEG-9 Polydimethylsiloxyethyl Dimethicone (And) Methicone	20 nm	167 nm	48%	pourable
	MTM3K50XZ4	Zinc Oxide (And) Methyl Trimethicone (And) PEG-10 Dimethicone (And) Methicone	20 nm	170 nm	48%	pourable
	MTM3K65HP1	Zinc Oxide (And) Methyl Trimethicone (And) PEG-10 Dimethicone (And) Triethoxycaprylylsilane	60-100 nm	239 nm	64%	paste
	PM9P25XZ4	Zinc Oxide (And) Isododecane (And) Polyhydroxystearic Acid (And) Methicone	20 nm	175 nm	24%	pourable
	PM9P60XZ4	Zinc Oxide (And) Isododecane (And) Polyhydroxystearic Acid (And) Methicone	20 nm	171 nm	58%	pourable
		WEIDDF65HP1	Zinc Oxide (And) Isododecane (And) Polyglyceryl-4 Isostearate (And) Cetyl PEG/PPG-10/1 Dimethicone (And) Hexyl Laurate (And) Triethoxycaprylylsilane (And) PEG-9 Polydimethylsiloxyethyl Dimethicone	60-100 nm	236 nm	62%

This table was prepared to assist in formulating with Volatile Non-D5 Dispersions. The information contained herein is believed to be accurate at the time of printing and represent typical values, but should not be used as a substitute for product specification sheets.

NA = Not available at the time of printing

* Size in dispersion : intensity-weighted mean size measured on Dynamic Light Scattering particles sizer

Our dispersions are often divided into two general categories:

1. High Solids[®] Dispersions: These are usually in paste form and have a high active ZnO or TiO₂ loading and efficacy.
2. High Speed[™] Dispersions: These are usually pourable and easy to incorporate into a formulation. They are highly transparent.

Formulation guidelines Zinc Oxide

Estimation of use level for SPF

- | | |
|----------------------------------|-----------------------|
| 1. PPS : 20 - 30 nm, PS < 150 nm | 1.0 - 2.0 SPF / ZnO % |
| 2. PPS : > 60 nm, PS > 200 nm | 0.5 - 1.0 SPF / ZnO % |

Formulation guidelines Titanium Dioxide

Estimation of use level for SPF

10 -15 nm TiO₂ Dispersions

1. SPF < 20 : 2.0 - 2.5 SPF / TiO₂ %
2. SPF > 25 : 2.5 - 3.0+ SPF / TiO₂ %

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