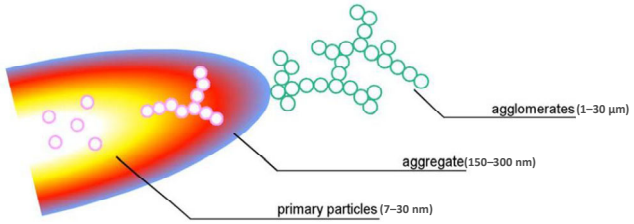
CABOT

FUMED METAL OXIDES

APPLICATION GUIDE

CAB-O-SIL® FUMED SILICA
FOR PERSONAL CARE



$SiCl_4$ in gas phase reacts spontaneously and quantitatively in an oxy-hydrogen flame with the intermediately formed water to produce SiO_2 molecules.

CAB-O-SIL® Fumed silica has an X-ray amorphous structure, does not causes any of the health problems such as silicosis associated with exposure to crystalline silica dust

CAB-O-SIL fumed silica is safe when ingested orally or used on the skin. It does not irritate skin and mucous membranes

CAB-O-SIL Functions

- Rheology Control
- Viscosity Stabilization
- Anti-settling
- Free Flow & Anti-caking
- Water Resistance & Adsorbent

CAB-O-SIL in Powder Formulations

- Improves free flow and anti-caking properties of powder
- Improves moisture resistance
- Provides greater compacting resistance
- Acts as a dry carrier
- Acts as drying agents (desiccants)
- Used as fillers

CAB-O-SIL in Liquid Formulations

Gel-forming agents, Rheology Control & Viscosity Stabilizer

- As a gelling agent, Cab-O-SIL modifies the viscosity of oils, waxes and emulsions
- Provides stable viscosity regardless of ambient temperature

Suspension Stabilizer (Anti-settling)

- CAB-O-SIL Fumed silica delays or prevents settling of pigments and powders (in suspensions)
- Improves stability and structure in creams, lotions, lipsticks and foundation products
- Stabilizes formulations by reducing sensitivity to temperature, electrolytes and pH
- The use of as little as 0.25 to 1.0 wt. % CAB-O-SIL will prevent hard pigment settling, such as in a pearlescent fingernail polish. It will also aid suspension and help prevent nozzle clogging in aerosol products

Emulsification

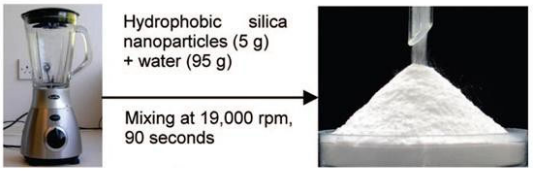
- Fumed silica when added to water in oil or oil in water emulsions, it acts as a secondary binder
- Prevents separation of oils & fragrances

Moisture Resistance

- Fumed silica provides moisture resistance to creams and gels

Dry Carrier of Liquids

- Fumed silica adsorbs perfumes and essential oils, which can be added to dry products while maintaining free flow properties of powders
- Dry water, where water can be converted into a dry free flowing powder form



Ref: J. AM. CHEM. SOC. 2008, *130, 11608–11609*

W/O Emulsion

Water-in-oil emulsion means more water, less cost and better feels, it provides

- Enhanced coverage on skin
- Rapid contact of oil-soluble actives, along with enhanced coverage, leading to benefits such as higher SPF's
- Enhanced barrier properties/Reduced evaporative water loss
- Enhanced moisturization and skin elasticity building
- Resistance to wash-off
- Protection of sensitive water-soluble actives
- Less disruption of skin lipid structure
- Lower preservative levels generally required
- Luxurious, shiny appearance

W/O emulsions a more viable platform for products like

- Daily sun care
- Facial treatment products
- Protective hand creams
- Body lotions, especially for darker skin types

Pickering Emulsion (O/W emulsion)

Pickering emulsion offers a very different aesthetic, one that dries very quickly on the skin, more suitable for

- Daily facial sunscreens
- High performance moisturizers
- Beach sunscreens
- Protective hand lotions
- Liquid foundations

CAB-O-SIL® Treated Silica in W/O Emulsion

Effective thickening

- Logarithmic viscosity boosting at low loadings (0.5 - 1.0% by weight)
- Easy addition
- Stable against phase separation

Process improvements

- No heat required
- No homogenization

Aesthetic improvement

- High Internal Phase achievable yielding less greasiness
- Smooth feel in comparison to wax
- Glossy appearance without oily feel

CAB-O-Sil® Fumed Silica in Pickering Emulsion

- CAB-O-SIL fumed silica can effectively stabilize emulsions and help reduce the surfactant content
- The finely divided CAB-O-SIL particles are enriched in the inter-phase between water and oil, thereby preventing the disperse phases from coalescing.

O/W Pickering Emulsion

	Wt %	INCI	Functions
(A)			
	20.0%	Ethylhexyl Palmitate	Emollient
	1.0%	Sorbitan Laurate	Blooming agent
(B)			
	73.0%	Water	
	3.0%	Propanediol	Humectant
	0.3%	Xanthan Gum	Hydrocolloid stabilizer
	2.0%	Cab-O-Sil M5	Emulsifier
	0.7%	Propylene Glycol / Diazolidinyl Urea / Methyl Paraben / Propyl Paraben	Preservative

Procedure

Phase (A) -Mix emollient and blooming agent with propeller agitation until uniform
Phase (B) - Disperse hydrocolloid into water/humectant with propeller agitation; add emulsifier with propeller agitation until uniform; add preservative
Add (A) to (B) with propeller agitation and homogenize for 2 minutes.

W/O Lotion

	Wt %	INCI	Functions
(A)			
	20.0%	Ethylhexyl Palmitate	Emollient
	1.0%	PEG-30 Dipolyhydroxystearate	W/O Emulsifier
	0.5%	Cab-O-Sil Treated Silica (Silica Dimethyl Silylate)	Rheology Modifiers
(B)			
	72.5%	Water	
	5.0%	Propanediol	Humectant
	1.0%	Propylene Glycol / Diazolidinyl Urea / Methyl Paraben / Propyl Paraben	Preservative

Procedure

Phase (A) - Melt and mix emulsifier; add emulsifier to slightly warmed with propeller agitation; add rheology modifier to emollient/emulsifier with propeller agitation
Add (B) to (A) very slowly with propeller stirring.

W/O Firm Cream

	Wt %	INCI	Functions
(A)			
	20.0%	Ethylhexyl Palmitate	Emollient
	1.0%	PEG-30 Dipolyhydroxystearate	W/O Emulsifier
	1.0%	Cab-O-Sil Treated Silica (Silica Dimethyl Silylate)	Rheology Modifiers
(B)			
	71.0%	Water	
	5.0%	Propanediol	Humectant
	1.0%	Propylene Glycol / Diazolidinyl Urea / Methyl Paraben / Propyl Paraben	Preservative
(C)			
	1.0%	Cab-O-Sil Treated Silica (Silica Dimethyl Silylate)	Rheology Modifiers

Procedure

Phase (A) - Melt and mix emulsifier; add emulsifier to slightly warmed with propeller agitation; add rheology modifier to emollient/emulsifier with propeller agitation
Add (B) to (A) very slowly with propeller stirring
Add [C] slowly with propeller stirring.

CAB-O-SIL Selection Guide

Application	Function	% Loading	Grades
Anti-perspirant (aerosol)	Suspension	0.25-1.0	M-5, EH-5,
Anti-perspirant (solid)	Rheology Viscosity Temperature Stability	1.0-3.0	M-5, H-5, TS-610
Creams	Viscosity control	1.0-3.0	M-5, H-5, EH-5
	Gels	4.0-8.0	
Dental Powder	Anti-caking	0.25-2.0	M-5, H-5, EH-5
	Adsorbent	20.0-40.0	
Fragrances	Adsorbent	20.0-40.0	M-5, H-5, EH-5
Hair Preparations	Anti-caking	0.25-2.0	M-5, H-5, EH-5
	Viscosity	3.0-8.0	M-5, H-5
Lipstick	Viscosity Temperature Stability	1.0-3.0	M-5, H-5, EH-5
	Slip/Feel	1.0-3.0	TS-530
Mascara & Makeup	Suspension Viscosity	0.25-1.0	M-5, H-5, EH-5
	Temperature Stability	1.0-3.0	
	Moisture Resistance	1.0-3.0	
Nail Polish	Suspension	0.25-1.0	M-5, H-5, EH-5, TS-610, TS-530
Powders	Anti-caking	0.25-2.0	M-5, H-5, EH-5, TS-610, TS-530
Sunscreen Products	Viscosity	1.0-3.0	M-5, H-5, EH-5,
	Temperature Stability	1.0-3.0	TS-720, TS-610
	Moisture Resistance	1.0-3.0	TS-720, TS-530
Toothpaste	Rheology	2.0-3.5	M-5, H-5

CABOT
cabotcorp.com

A SANMAR JV
Cabot Sanmar Limited
9, Cathedral Road, Chennai 600 086. India
Tel: +91 44 2812 8500
Email: silica@sanmargroup.com