

„Powder-to-Cream“

A concept for moisture
rich cosmetics in powder
form

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Common cosmetics dosage forms lack excitement for the consumer



Common formulation types

- Lipsticks
- Pressed powders
- Creams
- Lotions
- Nail polish

Differentiation by ...

- Colour
- Skin feel
- Fragrance
- Effect



Surprise your customers by experiencing something unexpected



Powder-to-Cream

- A novel and revolutionary formulation concept
- Produces moisture rich powders that will turn into an easily spreading cream on application
- Beautiful matte finish
- Oily feel is completely avoided



Powder-to-Cream

Silica is the key player in the game



Powdered Water

- Hydrophobic fumed silica
- Coating and stabilizing of water droplets
- Product suggestions:
 - AEROSIL® R 812 S (INCI: silica silylate)
 - AEROSIL® R 202 (INCI: silica dimethicone silylate)

Actives Absorbate

- Hydrophilic precipitated silica
- Carrier for active ingredients, fragrances etc.
- Product suggestions:
 - SIPERNAT® 22 LS (INCI: hydrated silica)
 - SIPERNAT® 500 LS (INCI: hydrated silica)
 - SIPERNAT® 50 S (INCI: hydrated silica)

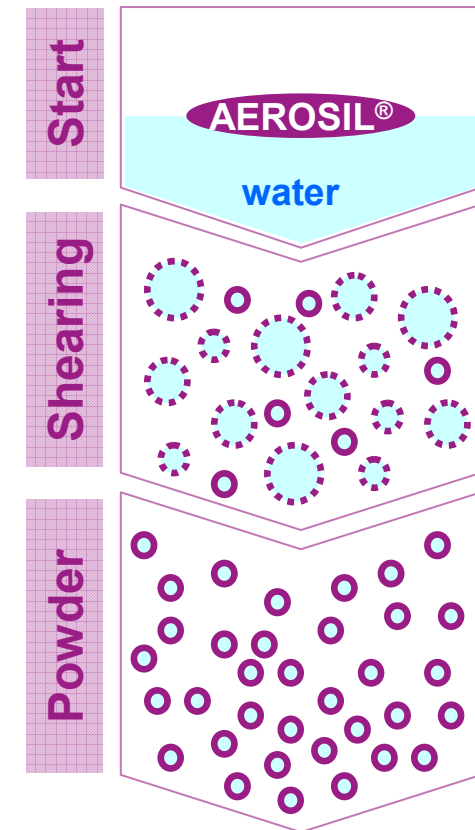


- 1. Powdered Water
AEROSIL® R 812 S for turning
aqueous formulations in dry
powders**
- 2. Actives Absorbate
SIPERNAT® to open up ways for your
own creative formulations**
- 3. Using Powder-to-Cream as a
formulation platform in your
production**

Powdered Water: AEROSIL® R 812 S to stabilize water droplets in powder form



- “Powdered water” whereby fine water droplets are generated and then coated and stabilized by hydrophobic AEROSIL® particles
- The more hydrophobic the AEROSIL® particles are the better the stabilization of the droplets works:
 - AEROSIL® R 812 S (Silica Silylate)
 - AEROSIL® R 202 (Silica dimethicone silylate)
- Works for water or aqueous solutions with high surface tension that don't wet out the AEROSIL® surface
- Only 5 weight-% AEROSIL® 812 S needed for pure water but more may be required if other ingredients are present in the aqueous phase
- Aqueous phase is released by mechanical destruction of the AEROSIL® shell



High shear to produce AEROSIL® coated water droplets required



- **High shear** mixing equipment is required for successful production of “Powdered Water”
 - Laboratory: high speed blender, dissolver
 - Production: rotor stator or toothed blade mixers
- **Circumferential speed** of > 20 m/s recommended
- Insufficiently mixed or **dead zones** in the reactor need to be avoided
- **Order of addition** is not important as the hydrophobic AEROSIL® will float on the aqueous phase
- **Processing temperature** needs to be controlled to prevent water vaporization
- **Mixing time** and **AEROSIL® quantity** need to be optimized for every individual formulation but **overmixing** may lead to insufficient product stability or cream generation



Sensitivity to added ingredients limits the possible formulations



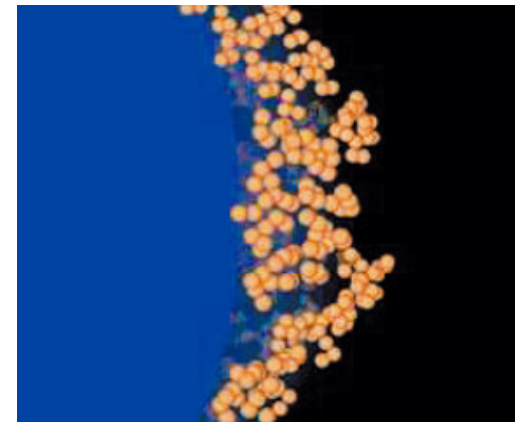
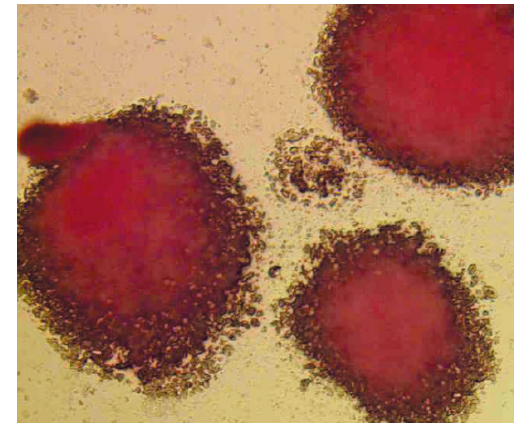
Droplet stabilization relies on

- high surface tension of aqueous phase
- water repellence and non-wetting of the AEROSIL® surface

Any ingredient that decreases surface tension or wets out the AEROSIL® surface will destabilize the system!

Limited formulation freedom

- choice of ingredient
- concentration of ingredients



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Limitations can be overcome by introducing Actives Absorbate



The Challenge

- Ingredients destabilizing Powdered Water have to be added separately as a second component
- Second component needs to be a powder independent of ingredient to be added

The Solution: Actives Absorbate

- Absorption of critical ingredients on an inert carrier
- SIPERNAT® carriers offer a wide selection of absorption capacities at reasonable costs
- Absorbate then needs to be mixed with the Powdered Water
- On application released water helps to liberate actives from the absorbate



SIPERNAT® carrier loaded with equal amount choline chloride



SIPERNAT®: versatile silica carriers for cosmetic applications



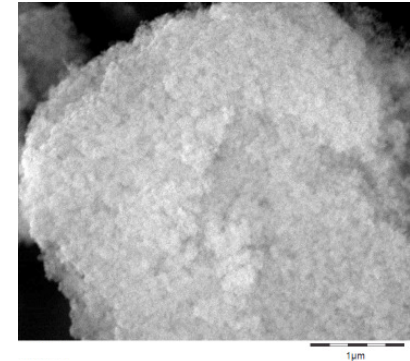
	SIPERNAT® 22 LS	SIPERNAT® 50 S	SIPERNAT® 500 LS
INCI name	Hydrated Silica	Hydrated Silica	Hydrated Silica
Specific surface area, multipoint	180 m ² /g	500 m ² /g	500 m ² /g
Particle Size, d50 (laser diffraction)	9.0 µm	18.0 µm	5.5 µm
Diethyl adipate (DOA) absorption, orig. material	235 ml/100 g	290 ml/100 g	285 ml/100 g
Tamped density	70 g/l	100 g/l	70 g/l



Capillary forces draw liquids into the pore structure of SIPERNAT® carriers



- SIPERNAT® exhibits a **highly porous** particle structure (hence the high BET specific surface area)
- Small pore diameter causes high **capillary forces** that draw the liquid into the particles
- Works for both for **polar** as well as **non-polar** liquids with suitable viscosity
- **Liquid to carrier ratio** depends on SIPERNAT® type used
- Liquids are retained in pore structure unless
 - pore structure is **destroyed**
 - liquid is removed by **evaporation**
 - it is **liberated** by a liquid with higher affinity to silica surface



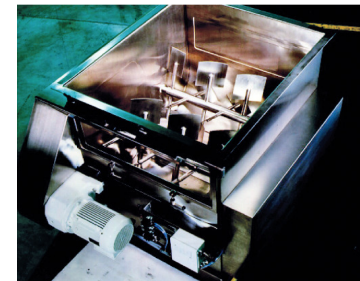
Liquid distribution and low shear mixing are essential for absorption



- Low shear mixing to prevent destruction of pore structure:
 - plow share mixers, double paddle mixers
- Put SIPERNAT® carrier into the mixer first
- Liquid addition preferably with the liquid **sprayed** in fine droplets on the SIPERNAT® carrier
- Optimization:
 - aim for **short mixing time**
 - aim for **low mixing speed**, avoid fast moving chopper blades



Lödige Maschinenbau
GmbH, Paderborn (DE)



Halvor Forberg A/S
Hegdal, Larvik (NO)



Blending both solid phases results in the final product with unique properties



Powdered Water

- AEROSIL® R 812 S
Aqueous phase
- High shear mixing

Actives Absorbate

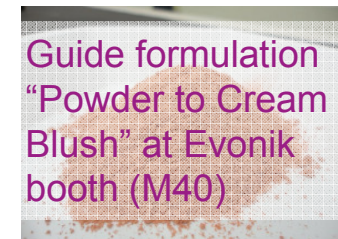
- SIPERNAT® carrier
Liquid actives
- Low shear mixing



Blending

Low shear mixer
e.g. free fall mixers

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Tool box concept – Powdered Water



Powdered
Water

- Basic

Powdered
Water

- With Light Diffusing Pigment (LDP)

Powdered
Water

- With Pearlescent Pigments

Powdered
Water

- With Mixed Ground Pigments (MGP)



Tool box concept

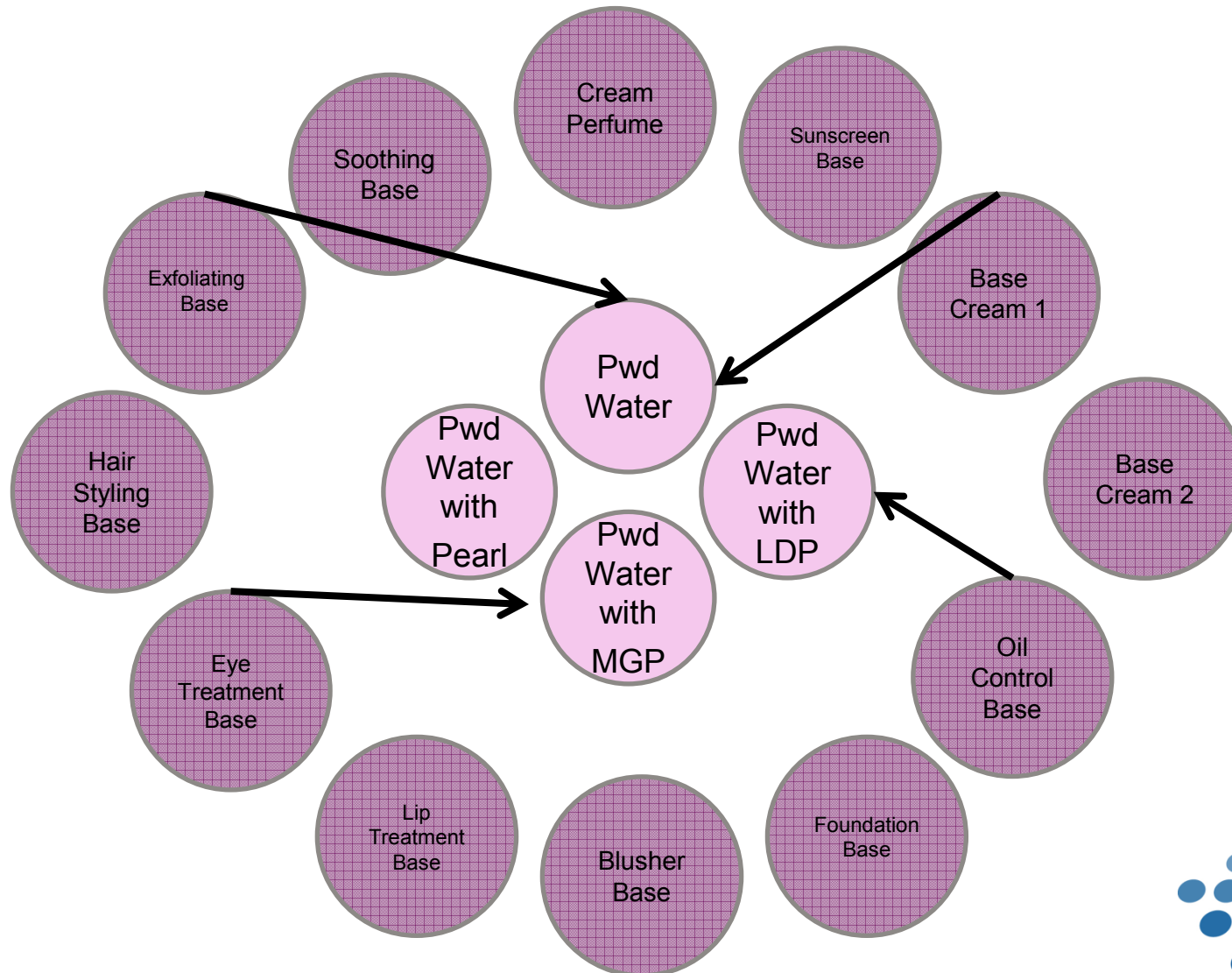
Active Absorbates



Oil Control	•Oil Control active
Cream Perfume Base	•Fragrance
Base Cream 1	•Low viscosity Liquid Paraffin
Base Cream 2	•Dimethicone
Soothing Base	•Soothing Active
Pigmented Base	•Incorporates blend of Iron Oxides and Titanium Dioxide
Blusher Base	•Incorporates treated pigment
Eye Treatment	•Anti-ageing Active
Lip Treatment	•Moisturising Active
Exfoliating Base	•Walnut Shell exfoliant
Styling Base	•Styling Polymer
Sunscreen Base	•Sunscreen Filters



Using the Tool Box



Tool box concept

Powder-to-Cream



- From 4 Powdered Waters and 12 Active Absorbates
 - Infinite formulation possibilities
- Ratio
 - Critical
- Cold Process
 - Lower energy consumption used in production
- Convenient
 - Day to day
 - Travel
- New powder to cream concept
 - Different approach for consumers & formulators



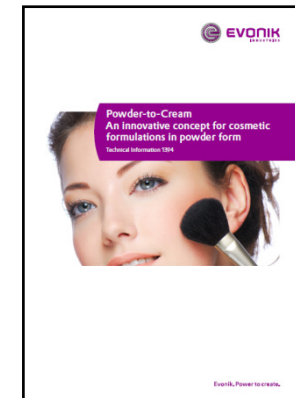
Sources for additional information



Powder-to-Cream brochure

Available from Evonik Degussa booth (M40)

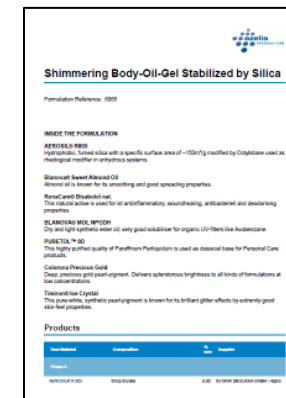
or www.aerosil.com



Guideline fomulations

Available from Azelis Personal care booth (M50)

or www.azelis.com





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