

AEROSIL® R 816 and AEROSIL® R 974

Particle-based stabilizers for emulsions



Emulsions, with their variety of applications, are probably part of the most popular personal care formulations. An emulsion is usually stabilized with organic emulsifiers. AEROSIL® fumed silica grades from Evonik offer an alternative technology to stabilize emulsions by solid particles. Due to the special surface modification of AEROSIL® R 816 and AEROSIL® R 974, these moderately hydrophobic fumed silica grades are recommended for this application. The stabilizing silica grades have a preference for their respective continuous phase, bring structure

to this phase and increase its viscosity which limits the mobility of the droplets. The silica enriches at the phase boundaries to prevent droplet coalescence. Grade and concentration of silica is chosen based on the type of emulsion required.

- **AEROSIL® R 816:**
oil-in-water emulsion (o/w)
- **AEROSIL® R 974:**
water-in-oil emulsion (w/o)

AEROSIL® fumed silica	AEROSIL® R 816	AEROSIL® R 974
Emulsion Type	oil-in-water emulsion (o/w)	water-in-oil emulsion (w/o)
Fumed silica treated with	hexadecylsilane	dimethyldichlorosilane
INCI name	Silica Cetyl Silylate	Silica Dimethyl Silylate
Appearance	Fine white powder	Fine white powder
pH value in 4 % dispersion	4.0 – 5.5	3.7 – 4.7

The advantages of using silica are the following:

- **o/w Emulsion:**
AEROSIL® R 816
1.5 – 2.0 wt.%

- **w/o Emulsion:**
AEROSIL® R 974
2.0 – 5.0 wt.%

- **Compatible with**
 - A wide range of emollients
 - Active ingredients
 - Traditional emulsifiers

- **Standard processing for both emulsion types**
- **Cold processable**
 - But no restriction for hot process if needed

- **Gives texture to the formulation**
- **Can reduce stickiness of oily formulations**
- **Flexible uses**
 - As the sole stabilizer
 - In combination with traditional emulsifiers

Processing Hints

Particle stabilized emulsions can be processed in standard equipment used in emulsion production. AEROSIL® can be used at room temperature and no activator is required. This way, time- and energy-intensive heating and cooling of phases is not needed. However, AEROSIL® R 816 and AEROSIL® R 974 as inorganic materials are not temperature sensitive and can be processed at higher temperatures if this is required due to other formulation ingredients. Silica also can be used along with traditional emulsifiers in an emulsion as co-stabilizer.

Both AEROSIL® fumed silica grades bring structure to the formulation. The dosage will influence viscosity and rheological properties of the respective emulsion. As a rule of thumb, a starting concentration of 1.5 – 2 wt.% for AEROSIL® R 816 and of 2 – 5 wt.% for AEROSIL® R 974 is recommended.

Sensory Evaluation

Panel studies underscores some important advantages when formulating with our technology. Test formulations

showed excellent spreadability, no whitening effect, reduced tackiness and leaving a non-drying skin feeling.

Regulatory and Product Safety

Evonik is able to produce products of completely amorphous structure. As an inorganic mineral, Silica is not biodegradable, but instead part of the natural geological cycle of silica.

Evonik silica products are recognized in the personal care industry for their versatility and effectiveness. Our products are characterized by their high purity and chemical inertness, which are especially important in cosmetic applications.

All products are manufactured at facilities certified according to the current standards ISO 9001 and ISO 14001.

We are happy to support you with product safety information for each product upon request. In these documents you will find useful information on for example registration, microbiology, animal testing and REACH, just to mention a few.

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