SIPERNAT®, ZEOFREE®, AEROSIL®, AEROXIDE®

Processing aid for plastic powders and plastic additives

EVONIK
Leading Beyond Chemistry

Your Benefits

Free flowing, antistatic plastic powders and pellets are easy to handle. They don't cause any problem when being conveyed and fed into subsequent processes such as compounding, extrusion, injection molding and sintering processes. SIPERNAT® and ZEOFREE® specialty silica, AEROSIL® fumed silica and AEROXIDE® fumed metal oxides are highly efficient flow- and anti-caking aids. They can help to render polymer powders or granules free-flowing, even after long term storage at elevated pressure and temperature. If electrostatic charging during mixing and handling processes is an issue, the addition of AEROXIDE® Alu C can help to reduce the electrical charge of polymer powders.

In case handling of a fluffy powder like AEROSIL® is challenging in your process, we can offer our ready to use highly filled AERODISP® fumed silica dispersions.

Liquid plastic additives are often difficult to homogeneously distribute into solid mixtures or polymer melts. So-called "concentrated dry liquids" represent easy flowable powder mixtures, which contain high amounts of liquid plastic additives absorbed on carrier silica from our line-up of SIPERNAT® specialty silica grades. Those dry liquid products provide all the benefits described above. Within our broad product portfolio, we have solutions for almost every special requirement, e. g. hydrophobic silica grades, which have both, a very low moisture content and low tendency to absorb water.

Their use is recommended for water sensitive polymers such as thermoplastic polyurethanes (TPU) or polyamides (PA). Easy to disperse silica grades can be divided extremely fine and do not block filter screens during thermoplastic processing. Selected silica and metal oxide grades provide high transparency of the final plastic articles, reduce the dust formation during mixing processes or provide antistatic properties. Silica types which comply to food contact regulations are available, if required.

Our Offer – Your Value

- Improved flowability
- Reduced caking tendency
- Antistatic properties
- Low dust formation
- Easy dispersibility
- Low water content
- Stable feeding and manufacturing processes
- Increased productivity
- Facilitated milling

SIPERNAT®, ZEOFREE®, AEROSIL®, and AEROXIDE® as free flow aid for plastics and plastic additives – typical applications

- TPS (Styrene Block-Copolymers, e.g. SBS, SEBS)
- TPU (Thermoplastic Polyurethane)
- TPO (Olefinic Thermoplastic Elastomers)
- PVC (Polyvinyl Chloride)
- EVA (Ethylene Vinyl Acetate)
- Acrylic Polymers
- Additive concentrates (MB)
- EPS (Expanded Polystyrene)
- Impact modifier
- Pigments
- Stabilizers

General product recommendations for free flow/anticaking effects in plastic applications

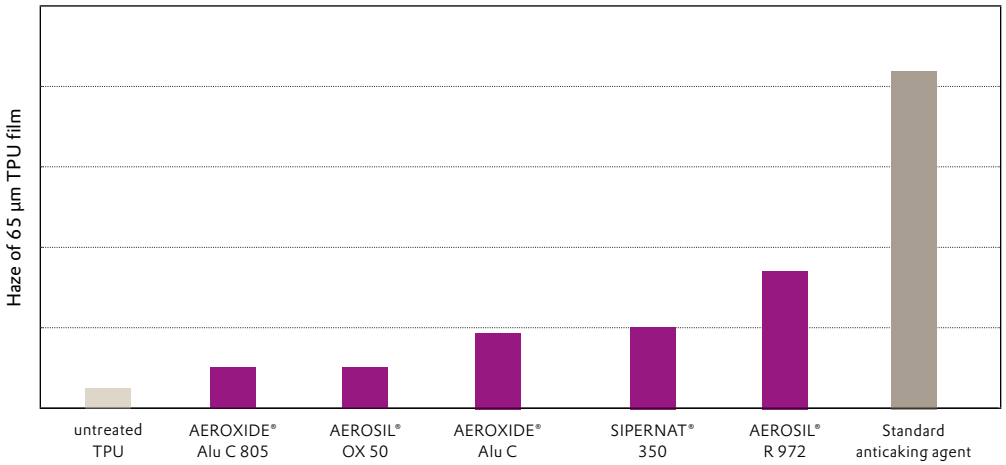
Product name	Product type	Typical mount added	Easy/Fine dispersion during mixing	Filterability (thermoplastic manufacture)
SIPERNAT® 22 S	hydrophilic precipitated silica	≤ 1 %	++	+
ZEOFREE® 5162	hydrophilic precipitated silica	≤ 1 %	++	+
SIPERNAT® 350	hydrophilic precipitated silica	≤ 1 %	++	++
SIPERNAT® D 17	hydrophobic, precipitated silica	≤ 1 %	++	++
AEROSIL® 200	hydrophilic fumed silica	≤ 1 %	++	++
AEROSIL® OX 50	hydrophilic fumed silica	≤ 1 %	++	++
AEROSIL® R 972	hydrophobic fumed silica	≤ 0,5 %	+++	+++
AEROSIL® R 812	hydrophobic fumed silica	≤ 0,5 %	+++	+++
AEROXIDE® Alu C	hydrophilic fumed alumina	≤ 0,5 %	+++	+++
AEROXIDE® Alu C 805	hydrophobic fumed alumina	≤ 0,5 %	+++	+++

+ good ++ very good +++ excellent

Keeping plastic films transparent

Besides providing proper handling of plastic powders or pellets, the anticaking agent must not impair major characteristics of the final plastic article. One example is the potential influence of anticaking aids on the transparency of subsequent manufactured film products. With the proper choice of an anticaking agent, the impact on the transparency and Haze respectively can be minimized.

Influence of 0.2 % addition of anticaking agent on the final transparency of extruded TPU films



SIPERNAT® and ZEOFREE® as carrier for plastic additives – typical applications

SIPERNAT® and ZEOFREE® are the choice for converting liquid plastic additives into free flowing powders.

Our Applied Technology team has the expertise and equipment to solve your individual challenges.

- Plasticizers
- Lubricants
- Blowing agents
- Peroxides
- Antistatic agents
- Anti-fogging agents

General product recommendations for carrier silicas in plastic applications

Silica grade	Flowability of absorbate	Absorption capacity	Dispersibility in polymer matrix	Additional remarks
SIPERNAT® 22	+++	++	●	comparatively large average particle size
SIPERNAT® 22 S	+	++	+	
SIPERNAT® 22 LS	+	++	++	
ZEOFREE® 5161 A	+++	++	●	comparatively large average particle size
SIPERNAT® 50	++	+++	●	comparatively large average particle size
SIPERNAT® 50 S	+	+++	+	
SIPERNAT® 500 LS	+	+++	++	

+ good ++ very good +++ excellent ● standard

Our Service to you

- Product quality and product safety
- Customer proximity
- R&D, Applied Technology
- Technical Service
- Handling technology
- Supply security
- Logistic concepts
- Technical literature

Our Applied Technology team will be pleased to assist you to solve your individual challenge. Our laboratories are equipped to prepare solid mixtures, measure flowability in different ways and simulate caking by adjusting defined pressure, temperature and moisture conditions. Dust properties and fluidizing behavior of polymer blends can be determined as well. Moreover, a pilot plant with facilities for plastic compounding and processing is available. The potential influence of silica products on the final plastic article can be investigated.

In case you need support regarding the handling of our silica products, e. g. storage, dust-free conveying and dosage, our Handling Team will be pleased to get into contact with you to discuss your specific requirements.

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The Silica specialists at Evonik – Inside to get it right.

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