FLO-GARD™
Flow Conditioning Silicas

FOOD

PPG pioneered the development of synthetic precipitated silicas, becoming one of the first manufacturers to bring them to market in the 1930s. Today, PPG remains a global leader in the manufacture of precipitated silicas, supplying a wide range of high-quality silica products engineered for many end-use applications, including carrier agents and anti-caking/free-flow agents for food applications.

FLO-GARD™ Flow Conditioning Silicas: Performance Engineered Silicas for the Food Industry

For more than 30 years, food product formulators have relied on FLO-GARD™ flow conditioning silicas to prevent caking and optimize the free-flow characteristics of food products enabling improved product performance and manufacturing productivity.

The legacy of quality, reliability, and technical competence continues today. PPG is dedicated to helping solve customer challenges by providing highly engineered precipitated silicas and world-class technical and customer service, while anticipating the evolving and increasingly sophisticated demands of the food product industry.

Flo-Gard flow conditioning silicas are synthetic amorphous precipitated silicas that are odorless and tasteless with a neutral pH, making them suitable for a wide variety of flow conditioning applications, from *Flo-Gard* LPC silica for demanding large particle food product applications to *Flo-Gard* T-800 silica for challenging ultra-fine food product applications.

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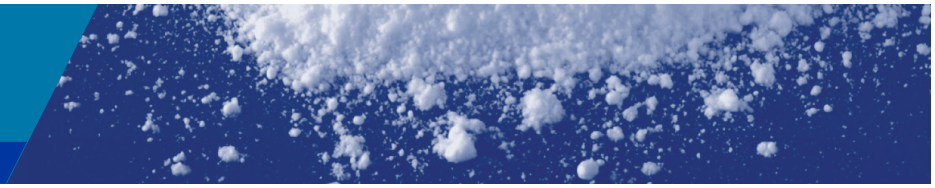

Several factors determine the optimal *Flo-Gard* silica for a given anti-caking/free-flow application. These include powder flow behavior, the mechanisms through which powder flow behavior can be improved, and customer-specific product and process details and conditions.

Generally, powder flow behavior is determined by:

- Finished food product particle shape, size, size distribution, and specific gravity
- Overall particle cohesion of the food product
- Electrostatic charges carried by the food product

Flo-Gard flow conditioning silicas improve powder flow through one or more of the following mechanisms:

- Partitioning irregularly shaped particles
- Adsorbing particle surface moisture
- Dusting (plating) sticky particle surfaces
- Acting as a dry lubricant
- Stabilizing electrostatic charge variation

Other factors that impact the effectiveness of any free-flow/anti-caking agent in a food product include product and process specific conditions, such as:

- Commercial equipment being used for blending (ribbon blenders, stand mixers, etc.)
- Environment in which the material is being blended (humidity, temperature, etc.)
- Order of addition, as well as location and method of silica addition to the process (blending rate, type of addition, etc.)

PPG has dedicated resources with experience in a wide variety of applications, equipment, and operating conditions to help determine the best *Flo-Gard* anti-caking/free-flow agent and operating conditions for optimal performance.

Flo-Gard Flow Conditioning Silicas — Typical Properties

Product	Particle Size, µm	DOA Oil Absorption Number, mL/100g	pH	Residual Salt Type	Bulk Density		General Use Recommendations
					lb/ft3	g/L	
Flo-Gard LPC	135	250	6.9	Na_2SO_4	12.0	195	Medium to large particle size applications
Flo-Gard SP	45	275	6.9	Na_2SO_4	11.0	175	Medium particle size applications with higher oil and fat absorptivity
Flo-Gard AB/AB-D	40	310	6.9	Na_2SO_4	8.0	130	Medium particle size applications with higher oil and fat absorptivity, including with aqueous components
Flo-Gard FF/FF-D	20	215/240	7.0	Na_2SO_4	8.0	130	Fine particle size applications with higher oil absorptivity
Flo-Gard 915	10	265	6.9	Low Na_2SO_4	5.0	80	Fine to ultra-fine particle size applications with increased oil absorptivity
Flo-Gard T-700	4	275	6.9	Na_2SO_4	2.5	40	Ultra-fine particle size applications
Flo-Gard T-800	2.5	270	6.9	Na_2SO_4	2.0	30	Demanding ultra-fine particle size applications

* Median particle size by laser diffraction.

The following table provides starting-point recommendations for *Flo-Gard* flow conditioning silica by food application and the applicable Food and Drug Administration (FDA) Title 21 Code of Federal Regulation (CFR). Actual results may vary depending on specific ingredients and process conditions. Final product selection should be based on testing in customer-specific products and processes.

***Flo-Gard* Flow Conditioning Silicas — Typical Applications**							
	***Flo-Gard* LPC**	***Flo-Gard* SP**	***Flo-Gard* AB/AB-D**	***Flo-Gard* FF/FF-D**	***Flo-Gard* 915**	***Flo-Gard* T-700**	***Flo-Gard* T-800**
Cocoa Powder			■	■			
Dried Egg Yolks*			■	■			
Dried Eggs*			■	■			
Garlic and Onion Salt		■		■	■		
Instant Coffee and Tea		■		■	■	■	
Ground Herbs and Spices	■	■	■	■	■	■	
Lemon, Lime and Orange Powders		■		■	■		
Malt-emulsifier Powder		■		■	■		
Non-Dairy Creamer		■		■	■		
Pancake and Cake Mixes			■	■			
Paprika	■	■		■	■		
Powdered Drink Mixes		■		■	■		
Powdered Milk			■	■			
Powdered Sugar				■	■	■	■
Granulated Salt and Sugar	■	■		■	■		
Grated Cheese**			■	■			
Tableting Aid	■	■		■	■		
Salt and Sugar Substitutes	■	■		■	■		

Except as noted, all applications conform to 21 CFR 172.480, which allows precipitated silica in quantities not to exceed 2% by weight of the finished food product.
* Per 21 CFR 160.185 and 21 CFR 160.105, silica is limited to no more that 1% of the finished food weight
** Per 21 CFR 133.146, silica is limited to no more than 2% of the finished food weight

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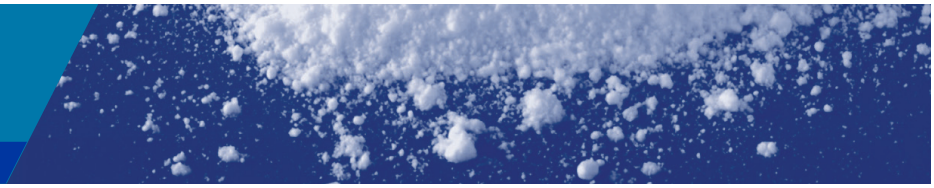

Product Safety and Regulatory Information

For the latest safety and regulatory information, please reference:

- Product Safety Data Sheets, available at www.ppgsilica.com/SDS
- Global Product Safety and Regulatory Information Sheet, available at www.ppgsilica.com/GPSRIS

Packaging

Standard packaging includes small bags and Flexible Intermediate Bulk Containers (FIBCs). Bags are unitized for shipping on pallets which are stretch wrapped with clear plastic film. FIBC's are double stacked on wood pallets. Please consult with Customer Service or your sales representative regarding additional packaging options including custom package sizes and bulk shipments.

Samples

Samples are available upon request from Customer Service.

Storage

To ensure product integrity, PPG recommends that our silica products be stored under dry, clean conditions and protected against exposure to other substances. Since silica may pick up moisture, we also recommend that products that are stored for more than one year from the date of manufacture be re-tested for moisture content. There is no shelf life limit when stretch-wrapped palletized units or bags are kept under the above stated conditions. Pallets should not be double-stacked.

Safety and Health Effects

PPG recommends that, before use, anyone using or handling this product thoroughly read and understand the information and precautions on the label, as well as in other product safety publications such as the Material Safety Data Sheet. Any health hazard and safety information contained herein should be passed on to your customers or employees, as the case may be. The products mentioned herein can be hazardous if not used properly. Like all potentially hazardous materials, this product must be kept out of the reach of children.

Visit www.ppgsilica.com for more information.

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