

PPG HI-SIL[®]

Silica Products for Industrial Applications



INDUSTRIAL CARRIER

Carrier, Free-Flow, Anti-Caking and Anti-Blocking

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 manufacturing of precipitated silicas, supplying a wide range of high-quality silica products engineered for a variety of end-use functions, including carrying, free-flowing, anti-caking and anti-blocking agents within a broad range of industrial applications.

Our PPG HI-SIL[®] silica products serve a variety of functions across the industrial segment and can deliver value through **product performance improvement**, **manufacturing efficiency** and **cost savings**.



Silica Role	Typical Product Benefit ¹	Performance Improvement	Manufacturing Efficiency	Cost Savings
Imparts uniformity to irregularly shaped particles	Free-flowing, excellent blending, mixing, screening and packaging	■	■	
Serves as dry lubricant	Excellent blending and mixing		■	
Absorbs ambient moisture and oils from particles	Reduces caking and moisture pick-up, supports extended product shelf life	■	■	■
Transforms liquids into solid, dry liquid concentrate (DLC)	Storage, transportation, and processing flexibility and control	■	■	
Reduces agglomeration, especially in sticky and highly viscous liquids	Supports ease-of-handling, yield improvements, and dosing	■	■	■
Achieves consistent, high loading and carrying of liquid ingredients, chemicals, specialty materials and other substances	Supports accurate concentration and dosing, can support waste reduction	■		■
Serves as anti-blocking agent in some polymer applications	Reduces coefficient-of-friction (COF)	■	■	
Can reduce foaming when paired with other substances	Supports foam control	■	■	

¹Product is defined as the ingredient, chemical, specialty material, or substance to which silica is being added to achieve the desired benefit. Typical benefits are relative to the product without silica added. Benefits are observed in a combination of customer applications and/or controlled lab settings. Users may or may not observe all of the aforementioned benefits based on their specific industrial application. The list of benefits is not exhaustive.

Potential Applications

PPG HI-SIL® silica performs as a carrier, free-flowing, anti-caking and anti-blocking agent in a range of environments, including:

- Carrier and dry liquid concentrate (DLC) for ingredients, chemicals, specialty materials, and substances
- Free-flow and anti-caking agent for cohesive powder products and active ingredients
- Anti-blocking agent in some polymer applications
- Microplastic-free abrasion media for detergents and soaps
- Defoamers and surfactants for cement, construction, pulp and coatings²

Product Recommendations³

Delivering a wide range of physical properties, our PPG Hi-Sil silica portfolio contains products specifically designed to deliver superb performance. While the suitability of each product and packaging type is specific to each customer and application, the following table provides particle size and the strengths of each product to help you begin the evaluation process. Actual results may vary depending on process conditions. Final product selection should be based on testing in customer-specific products and processes.

+++	Preferred
++	Recommended
+	Suitable

Manufacturing Location	PPG Silica Product	Particle Size, µm*	Carrying / Dry Liquid Concentrate	Free-Flowing / Anti-Caking	Anti-Blocking
North America	Hi-Sil 210	1,400	+++	+	
	Hi-Sil 213	600	+++	+	
	Hi-Sil SC-72X	250	+++	++	
	Hi-Sil 215	250	+++	+	
	Hi-Sil LPC	140	+++	++	
	Hi-Sil SP	45	+	+++	
	Hi-Sil ABS	40	+++	+++	
	Hi-Sil FF	20		+++	
	Hi-Sil 233	18	+++	++	+
	Hi-Sil 532EP	15		+	+
	Hi-Sil 915	10	+	+++	
	Hi-Sil T-600	5.5		++	+
	Hi-Sil T-700	4		++	+
	Hi-Sil T-152	4		++	+
	Hi-Sil T-800	2.5		++	+
Europe	Hi-Sil 255C-D	45	+++	++	
	Hi-Sil 233-D	40	+++	++	+
	Hi-Sil ABS-D	40	+++	+++	
	Hi-Sil 315-D	30	++	++	
	Hi-Sil 155C-D	22	+++	++	

* Median D 50 particle size as determined by laser scattering.

² May require pairing silica with other substances to deliver defoaming benefits.

³ Suitability ratings are based on the experience of PPG's technical service team.

Performance

The PPG HI-SIL® silica portfolio contains products that offer a wide range of forms, particle sizes and other physical properties. Modified and controlled during the manufacturing process to perform a specific function, these products are versatile and can generally serve more than their originally intended purpose in an industrial formulation or process.

PPG Silica Product	Particle Size, μm^*	DOA Oil Absorption, mL/100g	pH	Bulk Density		Carrying Capacity**
				lb/ft ³	g/L	
Hi-Sil 210	1,400	200	7.0	15.0	240	60-65%
Hi-Sil 213	600	200	6.9	16.0	256	60-65%
Hi-Sil 215	250	200	7.0	15.0	240	60-65%
Hi-Sil SC-72X	250	290	6.7	13.0	208	70-75%
Hi-Sil LPC	140	250	6.9	12.0	192	60-65%
Hi-Sil 255C-D	45	290	6.3	8.0	128	65-70%
Hi-Sil 233-D	40	280	7.0	8.5	136	60-65%
Hi-Sil ABS	40	305	6.9	8.0	128	70-75%
Hi-Sil ABS-D	40	305	6.9	8.0	128	70-75%
Hi-Sil 155C-D	22	285	6.9	5.0	80	55-60%
Hi-Sil 233	18	190	7.0	9.0	144	55-60%

* Median D 50 particle size as determined by laser scattering.

** Carrying capacity is an typical range based on the experience of PPG's technical service team.

Carrying and Dry Liquid Concentrate (DLC)

Offered in a range of particle sizes, several of our PPG Hi-Sil silicas are engineered to convert a liquid – especially a sticky or highly viscous liquid – into a dry, free-flowing powder. When liquids are converted to powders that are easy to pour and have good flow characteristics, the benefits can include:

- More accurate dosing and measurement of ingredients and substances
- Efficient mixing and processing times for customer manufacturing processes
- Improved flowability, which can reduce the likelihood of equipment blockages and downtime during processing
- Ease-of-handling, transport and storage of liquid active ingredients and chemicals

PPG Silica Product	Particle Size, μm^*	DOA Oil Absorption, mL/100g	pH	Bulk Density		Carrying Capacity**
				lb/ft ³	g/L	
Hi-Sil SP	45	275	6.9	11.0	176	55-60%
Hi-Sil 315-D	30	290	7.0	6.0	96	60-65%
Hi-Sil FF	20	215	7.0	8.0	128	55-60%
Hi-Sil 915	10	265	7.0	5.0	80	50-55%

* Median D 50 particle size as determined by laser scattering.

** Carrying capacity is an typical range based on the experience of PPG's technical service team.

Free-Flowing and Anti-Caking

These PPG Hi-Sil silica products promote water scavenging, resulting in a consistent, free-flowing powder that is less prone to caking both during production and in the finished product. Benefits can include:

- Increased flow rates and flow rate consistency through equipment such as feeders, hoppers and pipes
- Improved flowability, which can reduce the likelihood of equipment blockages and downtime during processing
- Reduced caking in finished products due to absorption of ambient moisture

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 PPG's customer service team at 1-800-243-6745 (U.S.) or +31-596-676710 (Europe).

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.

Samples and Service

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 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.

Anti-Blocking

These PPG HI-SIL® silica products create a micro-roughness to polymers that reduce the blocking force that can cause a weak bond between polymer surfaces. A white and chemically inert substance with a range of pore sizes and volumes, *PPG Hi-Sil* silica serves as an excellent substitute for diatomaceous earth as an anti-blocking agent in a variety of polymer applications by reducing polymer-to-polymer surface contact and subsequent coefficient of friction (COF) that can hold particles together.

PPG Silica Product	Particle Size, µm*	DOA Oil Absorption, mL/100g	pH	Bulk Density		Carrying Capacity**
				lb/ft³	g/L	
<i>Hi-Sil</i> 532EP	15	186	8.0	10.0	160	40-45%
<i>Hi-Sil</i> T-600	5.5	230	6.9	2.6	42	50-55%
<i>Hi-Sil</i> T-700	4	275	6.9	2.5	40	50-55%
<i>Hi-Sil</i> T-152	4	265	6.9	2.0	32	45-50%
<i>Hi-Sil</i> T-800	2.5	270	6.9	2.0	32	50-55%

* Median D 50 particle size as determined by laser scattering.

** Carrying capacity is a typical range based on the experience of PPG's technical service team.

Visit www.ppgsilica.com for more information.



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