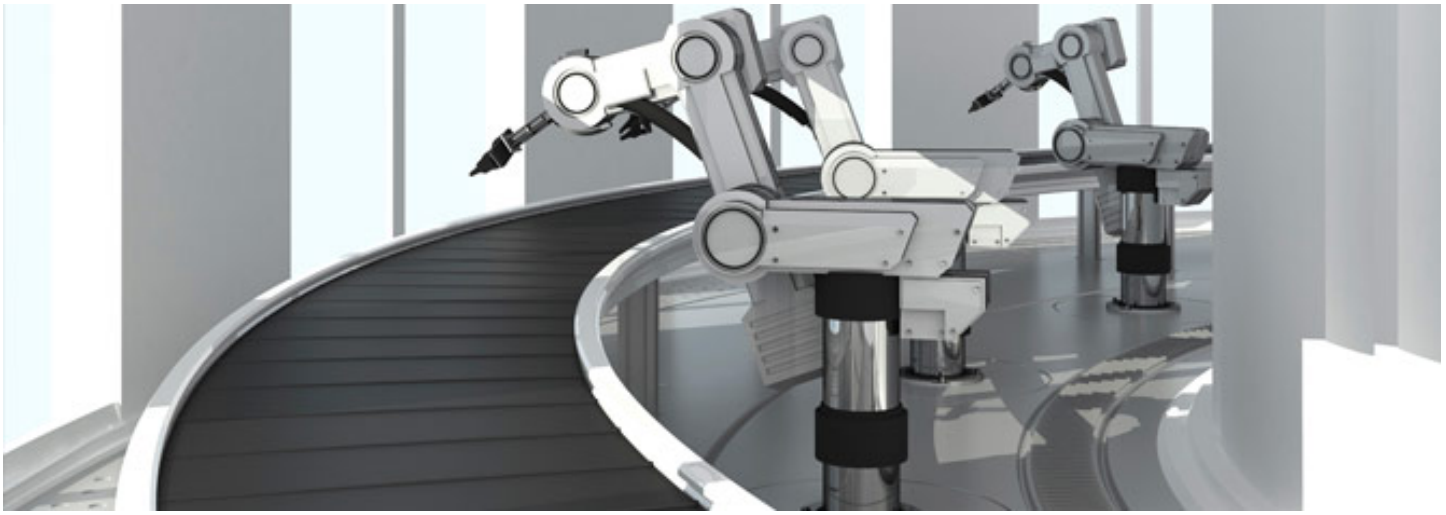
Rubber

INDUSTRIAL RUBBER



PPG Precipitated Silica for Industrial Rubber Applications

PPG introduced precipitated silica as an alternative reinforcing filler for carbon black in tires in the 1930s. Since that time, the development of PPG's reinforcing silica products has been inextricably bound to on-going advancements in global rubber compounding and manufacturing.

Today, PPG produces reinforcing synthetic amorphous precipitated silica products in powder, pellet, granular and micro-granular form for use in rubber manufacturing.

Formulated in a variety of particle sizes and surface areas, these highly specialized products are engineered to increase the strength and durability of rubber for countless applications ranging from engine mounts, belts and hoses in automobiles, to wire and cable coatings, conveyor belts, printer rolls, syringe toppers, gaskets, seals, roofing systems, rubber gym floors and more.

AGILON®, CIPTANE™, HI-SIL® and SILENE™ Silica Products

PPG offers a full a range of industry-leading silica products. Together, they are designed to provide manufacturers with optimized processing characteristics – such as faster cure rates, easier mixing, better flow, or more flexible extrusion and color compounding capabilities – while imparting specific properties to finished high-performance rubber products, including:

- Increased stiffness and reinforcing strength
- Enhanced resistance to heat build-up and abrasion
- Better tear and tensile strength
- Improved color retention and/or translucence
- Superior chip and chunk resistance

Recommended Products and Typical Properties for Industrial Rubber Applications

Silica Product	N_2 (BET-5)Surface Area(m^2/g)	pH	Residual Salt Type	Physical Form	Reinforcement
***Silene* 732D**	33	8.5	Na_2SO_4	Powder	Semi-Reinforcing

***Hi-Sil* 532EP**	55	8	Na_2SO_4	Powder	Semi-Reinforcing
***Hi-Sil* 315-D**	125	7	Na_2SO_4	Powder	Reinforcing
***Hi-Sil* 315G-D**	125	7	Na_2SO_4	Granule	Reinforcing
***Hi-Sil* 210**	135	7	NaCl	Pellet	Reinforcing
***Hi-Sil* 233**	135	7	NaCl	Powder	Reinforcing
***Hi-Sil* 243LD**	135	7	NaCl	Granule	Reinforcing
***Hi-Sil* 900**	135	7	Na_2SO_4	Powder	Reinforcing
***Hi-Sil* 135**	150	7	Na_2SO_4	Powder	Highly-Reinforcing
***Hi-Sil* EZ160G**	160	7	Na_2SO_4	Granule	Highly-Reinforcing
***Hi-Sil* EZ160G-D**	160	7	Na_2SO_4	Granule	Highly-Reinforcing
***Hi-Sil* HDP-320G**	160	7	Na_2SO_4	Granule	Highly-Reinforcing
***Hi-Sil* 134G**	180	7	Na_2SO_4	Granule	Highly-Reinforcing
***Hi-Sil* 132**	180	7	Na_2SO_4	Powder	Highly-Reinforcing
***Hi-Sil* 190G**	195	6.5	Na_2SO_4	Granule	Highly-Reinforcing
***Hi-Sil* 915**	195	7	Low Na_2SO_4	Powder	Highly-Reinforcing
***Hi-Sil* EZ200G**	300	7	Na_2SO_4	Granule	Highly-Reinforcing
***Ciptane* LP**	170	7	Na_2SO_4	Bead	Reinforcing, 2.5% Mercapto-Silane

Agilon Performance Silica Products

Agilon performance silica is a patented material that is engineered to enhance the benefits of traditional precipitated silica by managing heat build-up and improving tensile strength while lowering viscosity at processing temperature.

Based on a proprietary technology platform developed by PPG, *Agilon* performance silica also helps the rubber industry address the productivity and environmental challenges associated with *in-situ* silica/silane mixing. By enabling a simpler, more efficient mixing process, this revolutionary material reduces manufacturing complexity and capital investment by:

- Allowing the use of older mixing technologies
- Increasing mixing throughput
- Reducing energy consumption
- Eliminating almost all alcohol-related VOC emissions resulting from conventional silica/silane mixing

Additional benefits of *Agilon* performance silica include:

- Elimination of porosity-related extrusion inefficiencies
- Extended shelf life for uncured rubber
- Improved coupling in natural rubber applications
- Lower temperature mixing to avoid natural rubber degradation

Agilon Performance Silica

Product	Dispers-ibility	Reinforcing Capability	CTAB Surface Area (m^2/g)	N_2 (BET-5) Surface Area (m^2/g)	SH, Weight %	Carbon, Weight %	pH	Residual Salt Type	Physical Form
***Agilon* 400G**	High	High	130	75	0.5	4.0	6.8	Na_2SO_4	Granule
***Agilon* 454G**	High	High	200	140	0.5	4.0	6.8	Na_2SO_4	Granule
Agilon 458G	High	High	200	115	0.5	6.0	6.8	Na_2SO_4	Granule

Typical Applications

- Automotive engine mounts, belts and hoses
- Conveyor belts
- Elastic thread
- Rubber roofing and pond liners
- Gaskets and seals
- Rubber covered rolls
- Floor tiles and molding

Related Resources

- *Hi-Sil*, *Ciptane* and *Silene* Reinforcing Fillers for Industrial Rubber
- *Hi-Sil* 134G Technical Data Sheet
- *Hi-Sil* 190G and *Hi-Sil* 190G-M Technical Data Sheet
- *Hi-Sil* 200 Series Technical Data Sheet
- *Hi-Sil* 233-D & *Hi-Sil* 233G-D Technical Data Sheet
- *Hi-Sil* 255C-D & *Hi-Sil* 255CG-D Technical Data Sheet
- *Hi-Sil* HDP-320G Technical Data Sheet
- *Hi-Sil* EZ160G-D Technical Data Sheet
- *Hi-Sil* 532EP Technical Data Sheet
- *Agilon* 400 Technical Data Sheet
- *Agilon*, *Ciptane*, *Hi-Sil* and *Silene* silica in EPDM Overview

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