

Designed to improve the performance and the processing of highly dispersible silica (HDS) green tire tread formulations, Agilon™ 400 performance silica supports the tire industry's need for safer, more environmentally responsible products by lowering rolling resistance and improving tire handling and traction. *Agilon* 400 silica eliminates the need for a silane coupling agent, thus increasing manufacturing efficiency and reducing associated volatile organic compound (VOC) emissions. **Agilon 400 silica drives top line results through improved tire performance, while streamlining the manufacturing process for bottom line cost savings.**



### Benefits

- Enables tire makers to develop new and differentiated technologies
- Improves tire performance (rolling resistance, handling and traction)
- Reduces VOC emissions for a more environmentally responsible manufacturing process
- Increases production efficiencies by eliminating the silica/silane mixing step
- Enables high temperature mixing without increasing viscosity or causing premature vulcanization
- Eliminates extrusion inefficiencies due to porosity concerns
- Improves shelf life of uncured rubber

### Typical Properties

CTAB Surface Area, m <sup>2</sup> /g	130
pH	6.8
SH, Wt. %	0.5
Carbon, Wt. %	4.0
Skeletal Density	2.02 g/cm <sup>3</sup>
Bulk Density	~24 lbs/ft <sup>3</sup>
Form	Micro-granule

**AGILON**  
Performance Silicas  
by PPG

# Agilon™ 400

## Performance Silica

TIRE



### Typical Green Tire Tread Formulation

Conventional HDS	Agilon™ 400 Silica
103 / 25 Oil Extended Solution SBR / BR	103 / 25 Oil Extended Solution SBR / BR
Equivalent Specific Gravity	Equivalent Specific Gravity
Equivalent Sulfur Cure Package (Sulfur, CBS, & DPG)	Equivalent Sulfur Cure Package (Sulfur, CBS, & DPG)
<b>Added TESPT</b> Coupling Agent	<b>No Added</b> Coupling Agent
<b>2 non-productive</b> & 1 productive	<b>1 non-productive</b> & 1 productive
Non-productive mix = <b>16 minutes</b>	Non-productive mix = <b>9 minutes</b>
Dump Temperature = <b>160°C</b>	Dump Temperature = <b>170°C</b>

### Packaging and Samples

Product is available in FIBCs or small bags. Samples are available upon request from Customer Service.

### Storage

To ensure product integrity, PPG recommends that silica products be stored under dry, clean conditions and protected against exposure to direct sunlight and other substances. Material should be used within twelve months of the date of manufacture.

### Safety and Health Effects

PPG Industries 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.

In typical green tire tread formulations, sufficient heat is needed to create the chemical reaction between the polysulfide silane and the HDS. Not only is a VOC contributing alcohol by-product produced during the reaction, but at elevated temperatures, the polysulfide silanes generate sulfur in the reaction mixture (in-situ), which increases viscosity and can lead to premature curing. As a result, multiple non-productive mixing steps and associated cooling periods are needed to ensure the compound remains within an optimum temperature range.

Agilon 400 performance silica eliminates the need for these polysulfide silanes by connecting the silica core to the rubber matrix only after adding curatives (i.e. in the cure press). By eliminating the associated VOC contributing alcohol, as well as the requirement to maintain a given temperature range for the compound, Agilon 400 silica requires only a single non-productive, non-VOC contributing, mixing step and allows mixing temperatures that range as high as 190°C.

### Typical Laboratory Properties

	Conventional HDS	Agilon™ 400 Silica
Non-Cured		
Mooney Scorch (130°C), TS5, minutes	9	24
Mooney Viscosity (100°C), ML (1+4)	80	61
MDR Cure Time (150°C), TC90, minutes	29	22
Cured (150°C TC90 + 5 or 10 minutes)		
Dispergrader Dispersion, %:	99.6	99.6
Shore A Hardness	64	62
300% Modulus, MPa	17.4	17.3
300%/100% Modulus Ratio	6.4	6.2
Dynamic Properties		
Strain Sweep, 30°C, 1 Hz, G', 0.5%, MPa	1.91	1.48
Temperature Sweep, 1 Hz, 2 % strain		
Tan Delta, -15°C	0.53	0.80
Tan Delta, 0°C	0.24	0.30
Tan Delta, 60°C	0.06	0.04



PPG Industries

**USA**  
**PPG Silica Products**  
 440 College Park Drive  
 Monroeville, PA 15146 USA

Customer Service: 1-800-243-6745  
 Technical Service: 1-800-764-7369

**EUROPE**  
**PPG Industries Chemicals bv**  
 Silica Products  
 P.O. Box 181  
 9930 AD Delfzijl, The Netherlands

Customer Service: +31-596-676710  
 Technical Service: +1-724-325-5209