

# HDK<sup>®</sup> HYDROPHOBIC AND HYDROPHILIC FUMED SILICA

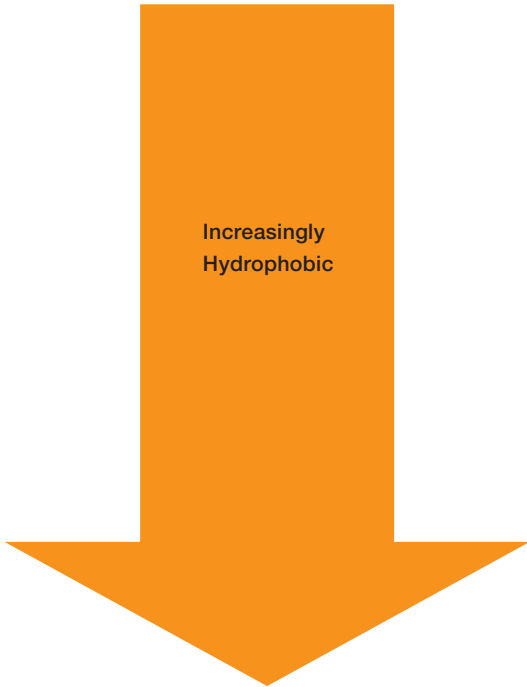
## HDK<sup>®</sup> Fumed Silica Provides Performance Enhancing Advantages

WACKER, a world-leading producer of fumed silica, offers a complete portfolio of hydrophobic and hydrophilic grades serving many industries and applications. Supported by decades of experience and hands-on technical expertise, HDK<sup>®</sup> fumed silica imparts outstanding reinforcement, rheology control and acts as a free-flow additive in powders.





HDK® FUMED SILICA – PRODUCTS & PROPERTIES		APPLICATIONS		
Product Type	Product Name	Treatment	Surface Area (mg <sup>2</sup> /g)	Function
Hydrophilic	HDK® V15	None	150	Reinforcement Rheology control
	HDK® N20	None	200	Reinforcement Rheology control
	HDK® T30	None	300	Free flow Reinforcement Rheology control
	HDK® H13L	Dimethyl-siloxo	130	Reinforcement Rheology control
	HDK® H15	Dimethyl-siloxo	150	Reinforcement Rheology control
	HDK® H20	Dimethyl-siloxo	200	Free flow Reinforcement Rheology control
	HDK® H30	Dimethyl-siloxo	300	Free flow Reinforcement Rheology control
	HDK® H2000	Trimethyl-siloxo	200	Reinforcement Rheology control
	HDK® H17	Polydimethyl-siloxo	150	Reinforcement Rheology control
	HDK® H18	Polydimethyl-siloxo	200	Reinforcement Rheology control



**Densed Grades**

Higher bulk density grades HDK® are available. These grades are made from standard HDK® that is mechanically compressed to increase the bulk density and enable it to be packaged more efficiently. This results in advantages in shipping and can be very useful in some applications. Densed grades may require more care in processing to get effective dispersion. Contact your Brenntag representative to see if a densed grade may right for your application.



## APPLICATIONS

Product Name	Adhesives, Caulks & Sealants				Coatings & Paints			Elastomers	
	Silicone	Elastomeric	Reactive Chemistries	Solvent-Based	100% Solids	Powder	Solvent-Based	Silicone	Natural & Synthetic
HDK® V15	••	•••		••				•••	•••
	••			••				•	•
HDK® N20	••	••		••			••	••	••
	•••	•	•	•••			••	•••	•••
HDK® T30						•••			
	•••	•••		••			•	••	••
	••			•			•	•	•
HDK® H13L	•••	•••			•		•	•••	•
	••		••		••		••	•	•••
HDK® H15	••	••			•		•	••	•
	•		•		••		•	•	••
HDK® H20						••			
	••	••			•		•	••	•
	•		•		••		•	•	••
HDK® H30						•••			
	••	••			•		•	••	•
	•		•		••		•	•	••
HDK® H2000	•••	•••		••				•••	•••
	•	•		•				•	•
HDK® H17	•	•			••		•		
			••		••		••		
HDK® H18	•	•			••		••		
			•••		••		••		

### HDK® in Food and Pharmaceutical Applications

HDK® N20 Nutrition is produced for food additive applications. It meets specific FDA standards and is handled in accordance with applicable food additive guidelines. It is primarily used as a free-flow and anti-caking additive. HDK® N20 Pharma meets the requirements of the major pharmacopeias. It is used in a variety of pharmaceutical applications and is especially useful as a glidant and reinforcement in tablets. Applicable certifications including Kosher and Halal are available for HDK® N20 Nutrition and HDK® N20 Pharma. See your Brenntag Representative for more information.





APPLICATIONS		BENEFITS
Product Name	Composites	Advantages
	Unsaturated Polyester    Vinyl Ester    Epoxy	
HDK® V15		Excellent reinforcement in elastomers, highly effective in silicones , provides some rheology control
HDK® N20	•••	Excellent rheology control in non-polar systems, good reinforcement
HDK® T30	••	Excellent rheology control where optimum transparency is needed – requires good dispersion, excellent free flow & anti-caking in powder systems
HDK® H13L	•                      •	Hydrophobic grade with excellent dispersability, capable of high loadings in non-polar systems for reinforcement, good rheology control in moderately polar systems
HDK® H15	•	Capable of high loadings in non-polar systems for reinforcement, good rheology control in moderately polar systems
HDK® H20	•	Free flow in powder coatings, grinding & processing aid in powder coatings, good rheology control in moderately polar systems
HDK® H30	•	Excellent free flow in powder coatings, grinding & processing aid in powder coatings
HDK® H2000		Provides highest reinforcement with minimum viscosity build in non-polar systems
HDK® H17	••                      ••	Good rheology control in polar systems needing the easiest dispersability
HDK® H18	•••                      •••	Excellent for rheology control in highly polar systems, outstanding for non-sag epoxy & urethane adhesives and sealants

**HDK® in Personal Care Applications**

HDK® is an important ingredient in a variety of cosmetic applications. WACKER has several products with INCI designations and full dossiers for personal care use. Please contact your Brenntag representative for more information.

- Highly recommended
- Recommended
- Suitable



# HDK® FUMED SILICA – PROPERTIES AND APPLICATIONS

WACKER's extensive experience in the production of fumed silica allows us to produce a product with outstanding performance. Our portfolio comprises HDK® grades for a wide range of applications in many different industries.

## HDK® Fumed Silica is:

- A synthetic pyrogenic amorphous silica
- Non-crystalline silica
- Odorless, chemically inert and has no adverse health or environmental effects when used as recommended

## HDK® Hydrophilic Fumed Silica is:

- Untreated and has a strong affinity for water
- Useful for thickening non-polar solvents such as xylene, styrene and mineral spirits
- Useful for reinforcing and thickening silicones



## HDK® Hydrophobic Fumed Silica is:

- Treated with a reactive silane to give water repellent characteristics
- Useful for thickening polar solvents and resins like alcohols, isocyanates, epoxies and urethanes
- Useful for reinforcing silicones without thickening

## Advantages

Fumed silica provides performance advantages in many ways:

- Reinforcement – improving strength in silicones and other polymers
- Rheology control
  - Thickening – tailored flow properties
  - Sag resistance – reduced sag of liquids and pastes
  - Anti-settling – prevents sedimentation and settling
  - Thixotropy – shear thinning viscosity profiles
- Free flow additive in powders

## Applications

Fumed silica is widely used in:

- Adhesives – for rheology control
- Caulks and sealants – for rheology control and reinforcement
- Composites – for rheology control
- Elastomers – for reinforcement
- Food – for free flow and anti-caking
- Paint, coatings and inks – for rheology control and free flow in powder coatings
- Personal care – for free flow in powders, rheology control in pastes and liquids and reinforcement
- Pharmaceutical – for free flow and reinforcement in tablets



# FLAME PROCESS – KEY TO VERSATILITY

Fumed silica is formed by the flame hydrolysis of silane at high temperatures. Primary particles of amorphous silicon dioxide, which do not exist outside of the reactor, fuse together producing chain-like, branched aggregates. These aggregates are the basic building blocks of HDK® which further form loosely bound agglomerates.

**HDK® aggregates:**

- Have an open, space-filling structure
- Have a high surface area
- Are highly interactive with a strong affinity to each other

This enables HDK® to impart many benefits such as reinforcement, free flow and rheology control.

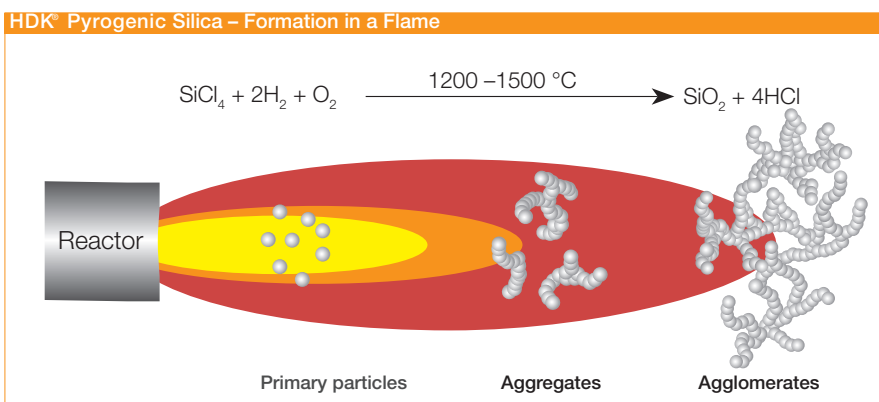
The rheology control provided by HDK® is an especially important benefit in many applications. When properly dispersed, HDK® aggregates form a structure that gives body to a liquid medium. This struc-

ture increases the viscosity to provide sag resistance and anti-settling properties. When subjected to shear forces, such as stirring, spraying or brushing, the network of HDK® aggregates breaks down. This reduces the viscosity for easy application. Once the shear is removed however, the network reforms and the liquid regains its original high viscosity. The amount of time it takes for this structure to rebuild

depends on the type and amount of the HDK® used and properties of the liquid such as the polarity.

For product, technical, or safety questions, please direct your inquiries to the Brenntag Solutions Group shown below.

WACKER's HDK® fumed silica product lines are represented as follows:



**BRENNTAG Companies**

Brenntag North America	United States
Brenntag Canada	Canada
Brenntag Latin America	Mexico, Central America, Caribbean, Colombia, Venezuela & Ecuador

**BRENNTAG Solutions Group:**  
888-9ASK-4BSG, 888-927-5427  
wackerinfo@brenntag.com

www.brenntagnorthamerica.com  
www.brenntagla.com

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