

mansil (HDS)

HIGH DISPERSION SILICA (HDS)

Depth and Understanding: Akrochem's line of reinforcing HDS silica easily disperses like non-reinforcing fillers. It improves mixing, processing, and consistency of rubber properties. It is a low dusting, granulated product that disperses as well as dustier powdered silicas. Mansil (HDS) silica improves quality and reduces processing issues in rubber compounding.

what is hds?

Mansil (HDS) is a highly dispersible form of precipitated amorphous silicon dioxide (SiO_2). Mansil (HDS) achieves outstanding dispersion in rubber compounds due to several enhancements when compared to standard precipitated silica products: 1) Traditionally, silica agglomerates resist breaking down to smaller particles. HDS reduces in size during typical rubber mixing. Most competitive "easy dispersing" silicas do not achieve the smaller particle size. 2) Higher structure on the particle surface produces more interaction with the polymer. 3) A higher activity surface also interacts more readily with the polymer. HDS silica will produce higher, more consistent physicals with easier processing.

PRODUCT	Mansil-175G (HDS)
Physical Form	Granules
pH (5%)	5.5 – 7.5
Surface Area, m^2/gm (BET)	170 – 190
Oil Absorption, DBP cc/100gm min.	230
Specific Gravity	2.1
Sodium Sulfate, % max.	1.5
Moisture, 2hrs. @ 105°C	3.0 – 7.0

why use hds?

Outstanding Physical Properties

Superior properties like tensile, tear and abrasion resistance result when compared to conventional silicas of equal surface area. To obtain these higher performance properties with normal silicas, a compounder would have to use higher surface area silicas resulting in higher viscosity and more difficult mixing. Mansil (HDS) silica mixes easier and develops a lower compound viscosity while improving physical properties. See Chart 1 showing tensile strength comparison between Mansil-175G (HDS) as well as two competitive HDS silicas. Perhaps even more important than the slightly improved physicals is more overall consistency in properties. Factory-mixed, traditional silica formulas tend to have scattered tensile and tear properties due to dispersion variation. The excellent dispersability of Mansil (HDS) silica results in more consistency of physical properties. Another bonus of the small particle size also means better translucency. Thus, transparency of shoe soles, toys, etc. can be improved.

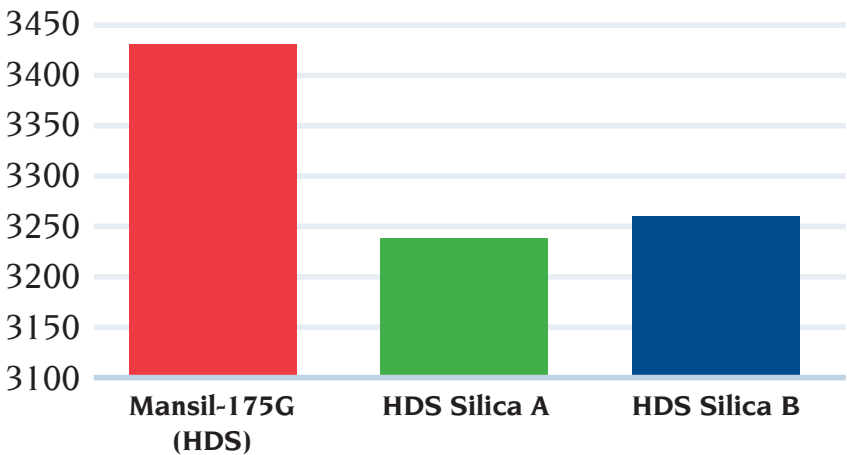
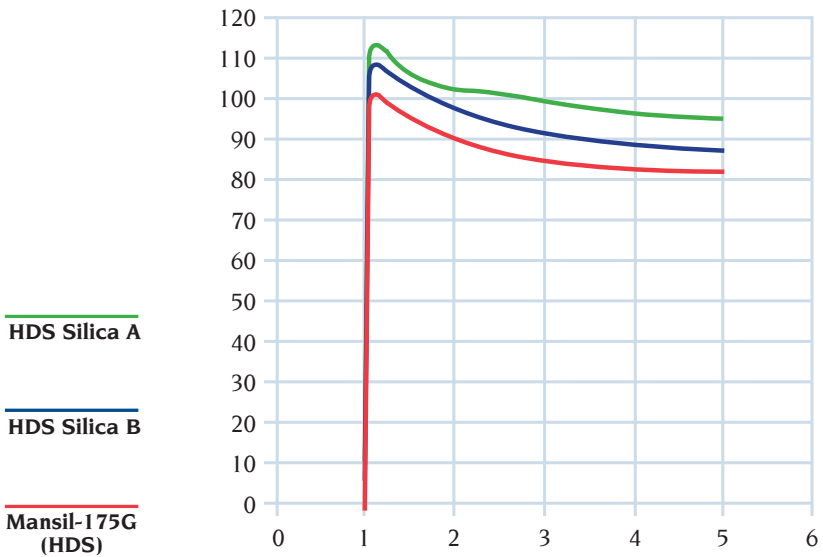


Chart 1: Tensile Strength in EPDM Compound

Better Processability

Improved viscosities vs. standard silicas (as well as other competitive HDS products) result in improved milling behavior, mold flow, extrusion, and calendaring. See Graph 1 showing viscosity comparison between Mansil-175G (HDS) as well as two competitive HDS silicas. Typical silica “boardiness” is significantly reduced. Better dispersion eliminates the excessive milling to get all the “white specks” out that normally exist when silica mixing. Batch-to-batch uniformity is improved.



Graph 1: Mooney Viscosity in EPDM Compound

Improved Dynamic Properties

Improved flex fatigue and lower hysteresis values (when a silane coupling agent is added) result from the better dispersed silica. High Dispersion Silicas have the added advantage of requiring less silane than standard silica due to their reactive surface chemistry.

Hot Tear Improvement

There are many molded goods that have undercuts that result in torn parts when demolding. Traditionally, silica has always been one tool to reduce this problem. Sometimes low loadings of silica helps; more often the hot tear is still inadequate and the silica loading must be increased. Uncured and cured properties change. Mansil HDS silica dramatically improves hot tear in most formulas even when used at lower loadings. Impact on processability and finished properties is minimized.

Improved Adhesion Properties

Many industrial rubber products have to be bonded to metal inserts or fabric backing. The extremely active surface chemistry of Mansil (HDS) promotes improved bonding to most substrates. Better bond strength, coupled with better tear strength is achieved through the use of HDS products which makes for higher final adhesion properties.

Low Dusting Form

Mansil HDS silica is provided in a low dusting, granular form. With normal silica the compounder must pay a penalty in the form of poorer dispersion when low-dusting, granular or compressed silica is used. HDS silica is exactly the opposite: low dusting with **improved dispersion**.

In Summary

Mansil High Dispersion Silica provides several benefits: outstanding physical properties, better processability, improved dynamic, hot tear, and adhesion properties. It can be a problem solver for the rubber compounder.



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