

Hi-Sil™ T-800 Thickening Agent

COATINGS

Performance Data Sheet

Hi-Sil™ T-800 precipitated silica thickening agent outperforms fumed silica and other precipitated silica thickening agents when evaluated in a model PVC plastisol sealant formulation containing a blocked isocyanate adhesion promoter.

As shown by the viscosity measurements in the below table, *Hi-Sil* T-800 provided more efficient thickening, a higher thixotropy index and improved viscosity stability over time, especially when compared to Fumed Silica A.

Brookfield Viscosity ¹	<i>Hi-Sil</i> T-800	Fumed Silica A	Precipitated Silica B	<i>Hi-Sil</i> T-600
Same-day, KcP				
2 rpm	672	280	432	362
20 rpm	112	58	63	55
Thixotropy Index	6.0	4.9	6.9	6.6
Aged, KcP				
2 rpm	770	528	386	404
20 rpm	130	106	69	78
Thixotropy Index	5.9	5.0	5.6	5.2

1. Viscosity readings were recorded after 60 seconds using a Brookfield Model RVT viscometer equipped with a #7 Spindle.

The following table and image to the right demonstrate the performance of *Hi-Sil* T-800 compared to Fumed Silica A, Precipitated Silica B and *Hi-Sil* T-600 in the vertical sag test.

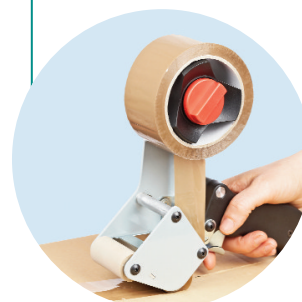


Vertical Sag (mm)	<i>Hi-Sil</i> T-800	Fumed Silica A	Precipitated Silica B	<i>Hi-Sil</i> T-600
Ambient Sag	2	43	29	20
Baked Sag	4	7	7	8
Total Sag	6	50	36	28



Applications

Adhesives
Sealants
Caulks
Putties
Gel coats



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Model PVC Plastisol Formulation²:

Component	Parts
PVC resin	14.00
PVC/7% vinyl acetate copolymer	14.00
Phthalate plasticizer	34.00
Odorless mineral spirits	1.50
Low absorptivity calcium carbonate	34.00
Calcium oxide	2.50
Catalyst	0.20
Blocked isocyanate adhesion promoter	5.00
Thickening/sag control agent ³	5.25

2. The model PVC plastisol formulation used herein was adapted from that described in Air Products and Chemicals, Inc. Publication No. 125.

3. The thickening/sag control agents evaluated were 100% *Hi-Sil* T-800, Fumed Silica A, Precipitated Silica B, or *Hi-Sil* T-600 so as to show the performance differences between the individual thickening/sag control agents.

Disclaimer:

The relative performance of fumed silica and precipitated silica thickening agents depends on a variety of factors. For example, Fumed Silica A was found to perform better than *Hi-Sil* T-800 in a PVC plastisol model formulation when an amide based adhesion promoter was used in place of a blocked isocyanate based adhesion promoter.

The following table and image to the right demonstrate the performance of *Hi-Sil* T-800 compared to Fumed Silica A in the horizontal sag test.

Horizontal Sag (mm)	<i>Hi-Sil</i> T-800	Fumed Silica A
Ambient Sag	0	21
Baked Sag	2	8
Total Sag	2	29



Sample Preparation:

A premix “masterbatch” containing all of the formulation components with the exception of the thickening/sag control agent was prepared in a SpeedMixer Model DAC 600 FVZ Mixer. The “masterbatch” was subsequently split into separate portions. Each thickening/sag control agent was then evaluated separately. One thickening/sag control agent was mixed into a portion of the masterbatch, degassed under vacuum to remove entrapped air and evaluated.

Sample Testing Protocol:

The horizontal and vertical sag evaluations were performed on electrocoated steel test panels. The edges of the test panels were masked with tape so that clean 4 inch beads of PVC plastisol could be formed on the test panels. The beads were drawn-down on the test panels using a custom drawdown bar having a semi-circle cutout measuring 18 mm in diameter. The masking tape was then removed so as to form a bead measuring 18 mm by 4 inches. One of the test panels was then positioned so that the drawdown bead was vertical (bead perpendicular to the benchtop), while the other panel was positioned so that the drawdown bead was horizontal (bead parallel to the benchtop). After sitting for 30 minutes at ambient conditions, the panels were marked for ambient sag. The panels were then baked at 285 °F (141 °C) for 30 minutes, after which they were marked for baked sag. Ambient sag and baked sag measurements were then taken and recorded.



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