

Rheology adjustment with easy to disperse SIPERNAT® Specialty Silica



SM-SI-SF-AT | December 2021 | Thomas Rieger & Julia Stuermer

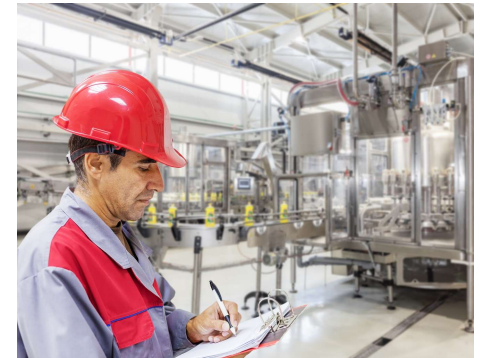
SIPERNAT® 

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Commercial Information

SIPERNAT® 380 provides suspension stability and rheology adjustment in high solids, natural oil-based liquid suspensions and emulsions. No increase in viscosity during aging. Easy to disperse vs. fumed silica (even with propeller stirrer). SIPERNAT® 380 may provide storage protection of grain crops in silos against beetles and mites. Encapsulation of actives in granulations possible during spray drying.

- Produced in Chester, USA
- Global availability
- Untreated precipitated silica; CAS 112926-00-8/7631-86-9
- Packaging: 20 lb paper bag

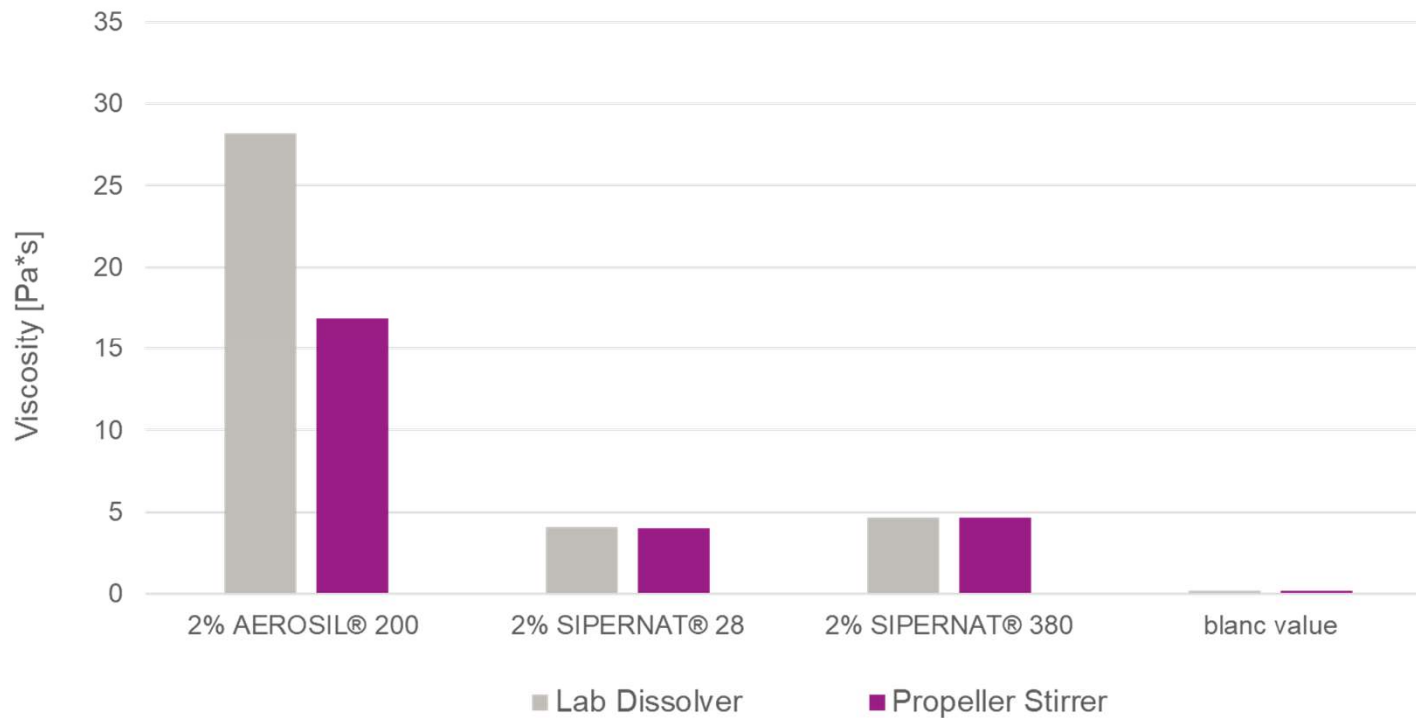


Benefits for thickening with SIPERNAT® Specialty Silica

- Constant level of viscosity whilst storage
- Suspension stability in high loaded formulations through homogeneous dispersion of very fine sized silica
- Easy to disperse by applying less shear energy
- Only standard dispersion equipment or activation necessary for application
- Easy to handle and low dust level in the production
- Amorphous structure and microplastic free

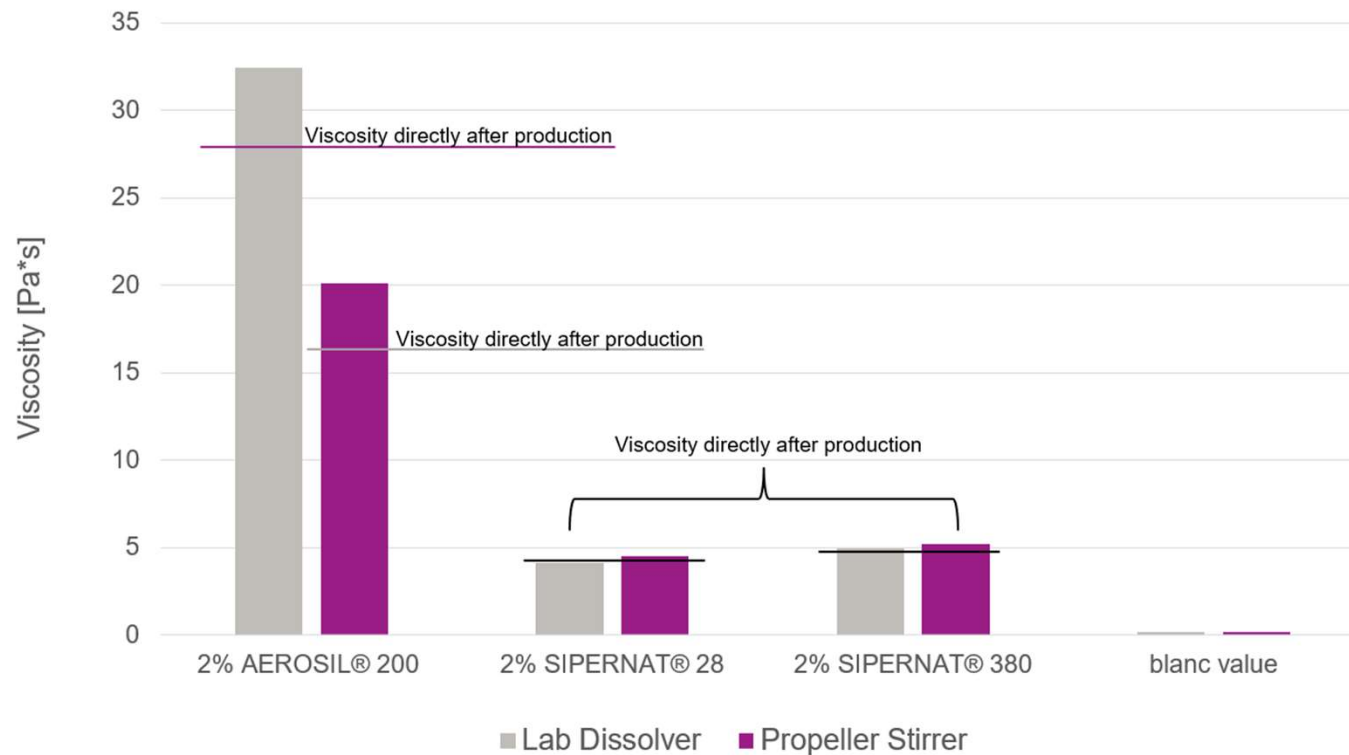
SIPERNAT® 28 and SIPERNAT® 380 - the easy to disperse alternatives to AEROSIL® fumed silica

Viscosity measurement directly after production



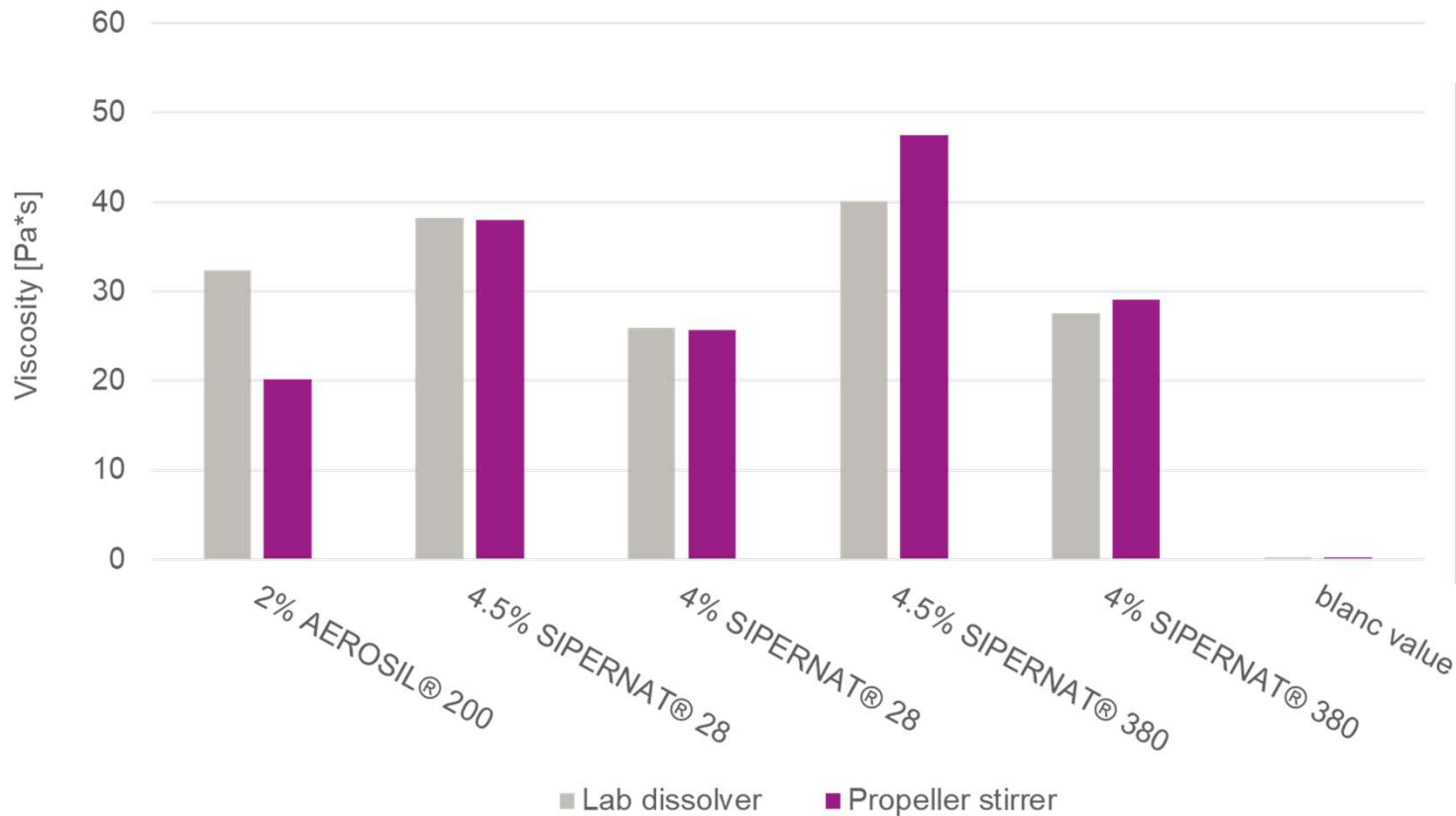
- SIPERNAT® specialty silica grades are easy to disperse with propeller stirrer
- Stable and good thickening performance with SIPERNAT® 28 and SIPERNAT® 380
- Higher viscosity level possible with AEROSIL® fumed silica if necessary

Viscosity measurement after 14 days storage



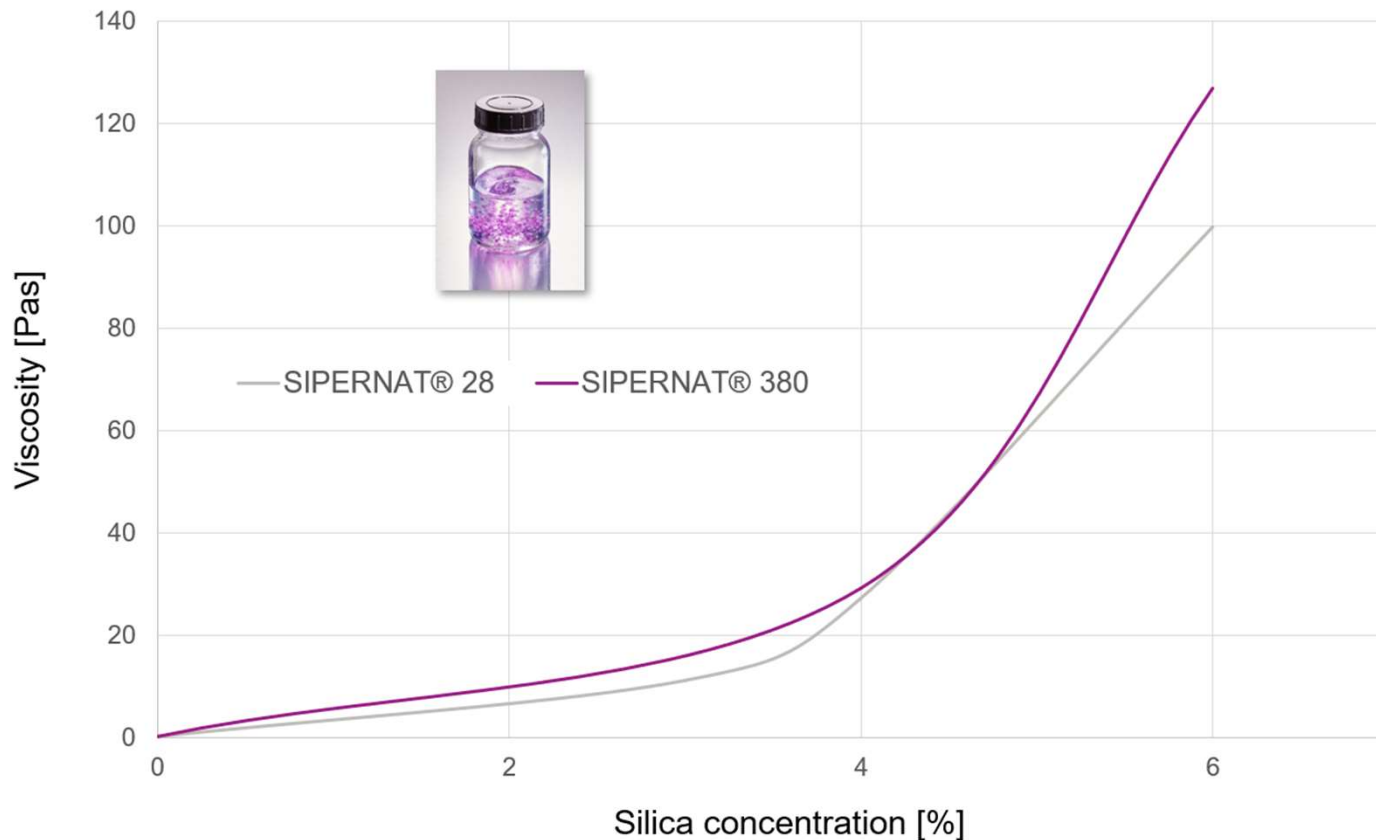
- Virtually no difference in the resulting viscosity whilst storage with the specialty silica grades
- Higher viscosity level with AEROSIL® types
- Full performance of fumed silica can be only obtained with high shear mixing equipment such as lab dissolver

Adaption of specialty silica concentration



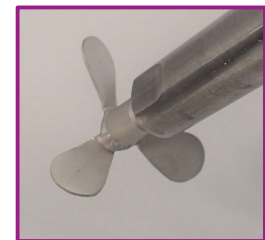
- Corresponding specialty silica concentration is 4 to 4.5%
- Slightly higher viscosity level with SIPERNAT® 380 when dispersed with propeller stirrer
- Addition ratio of specialty silica vs. fumed silica is around 2:1

Adequate thickening performance with less shear energy for dispersion



Dispersion conditions:

- Addition of 4 – 6% SIPERNAT® specialty
- Pre wetting step at 500 rpm applied for 5 min
- Dispersion time / speed 2000 rpm / 15 min applied by a propeller stirrer for example



SIPERNAT® 28 and SIPERNAT® 380 – product description

- Precipitated, amorphous silica
- Small particle size
- Medium bulk density
- Microplastic free
- Production locations: Chester and Havre de Grace/USA



SIPERNAT® 28

Median particle size	3 µm
Bulk density	95 kg/m ³
BET surface area	250 m ² /g
pH value	7

SIPERNAT® 380

Median particle size	0.3 µm
Tamped density	75 kg/m ³
BET surface area	180 m ² /g
pH value	4.8

Summary

	SIPERNAT® 28	SIPERNAT® 380	AEROSIL® 200
Silica structure	Precipitated Silica	Precipitated Silica	Fumed Silica
Thickening performance	Good	Good	Excellent
Post thickening	No	No	Possible
Dispersion energy	Low	Low	Very high
Dispersion equipment	Propeller stirrer	Propeller stirrer	Dissolver/Rotor-Stator
Silica concentration	4 – 6%	4 – 6%	2 – 3%



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