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TECHNICAL BULLETIN

Siltech® Pulp and Paper Products

DESCRIPTION

Siltech offers several product types for pulp and paper. **Siltech P-985, Siltech C-4852, Siltech P-950** and **Siltech PA-140** foam control compounds offer the formulator excellent foam control and flexibility.

Siltech P-101, P-102b, P-103 and **P-103b** emulsifiers provide strong, effective emulsification for foam control compounds and provide secondary benefits such as drainage.

Siltech P-135, P-150 and **P-160** dispersants provide excellent compatibilization, drainage and cloud point defoaming to pulp and paper formulations.

USES AND APPLICATIONS

Foam Control Agents: Siltech P-985, Siltech C-4852, Siltech P-950 and **PA-140** are characteristically used as the only antifoaming active in pulp and paper processes.

Key features and benefits: Siltech P-985, P-950, C-4852 and PA-140

- Highly effective and durable antifoaming and de-foaming
- Much more durable and effective when compared to oil-based products
- Easy to formulate into stable emulsions

Quick Comparison

Product	Knock-down	Durability (sec)	Ease of Dispersion	Foam Control Level	FDA 176.210	BfR XXXVI	GB 9685-2016
Siltech P-950	Excellent	>300	Good	Excellent	yes	yes	yes
Siltech P-985	Excellent	>300	Excellent	Excellent	yes	yes	no
Siltech C-4852	Good	>300	Excellent	Very Good	yes	yes	no
Siltech PA-140	Good	>300	Good	Good	yes	yes	no

Emulsifiers: Siltech P-101, P-102b, P-103 and **P-103b** are used in combinations as drainage aids in pulp manufacture and as dispersing and emulsifying agents for organic and silicone oils in pulping. They lower surface and interfacial tensions stabilizing water/oil and water/air interfaces. Significant foam control in water based formulations may also be seen.

Siltech P-101, P-102b, and **P-103** or **P-103b** recommended starting ratios are 1:2:1 as dispersion/ emulsifying agents for difficult to emulsify formulations. In many cases, other ratios and combinations are also effective emulsifier packages.

Key features and benefits: Siltech P-101, P-102b, P-103, P-103b

- High surface and interfacial activity
- Excellent emulsifiers for high silicone materials such as antifoam compounds providing dispersibility and stability.
- Prevents spotting and other effects of insoluble materials
- Improves drainage
- Contributes to foam control

Quick Comparison

Product	Appearance	Viscosity @ 25°C	Water Solubility @ 1%
Siltech P-101	Soft wax	N/A	Dispersible

Siltech P-102b	Clear to slightly hazy liquid	20,000 cPs	Insoluble
Siltech P-103		5,000 cPs	Insoluble
Siltech P-103b		30,000 cPs	Insoluble

Dispersants: Siltech P-135, P-150 and P-160 are FDA 176.210 listed dispersants and drainage aids used in pulping processes.

Key features and benefits: Siltech® P135, P-150 and P-160

- Cloud points of 40°C and <25°C
- Excellent surface and interfacial activity
- Strong dispersants for high silicone materials such as antifoam compounds providing dispersibility and additional stability.
- Improved drainage
- Foam knock-down

Quick Comparison

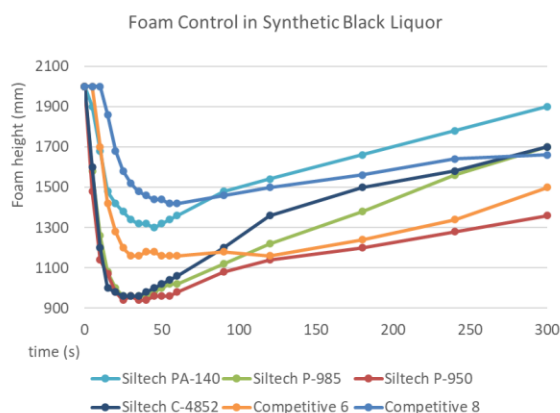
Product	1% Cloud Point	1% Surface Tension	Viscosity @ 25°C
Siltech P-135	40°C	32.5 mN/m	2,500 cPs
Siltech P-150	40°C	29.7 mN/m	2,000 cPs
Siltech P-160	25°C	31.7 mN/m	1,200 cPs

APPLICATION DATA:

The foam control products were compared in a recirculating apparatus where the foaming solution is brought to an elevated temperature and pumped through the apparatus to create foam. The foam control agent is then added and data measurement begins.

Knock-down is the immediate decrease in foam height, and **durability** is the time at which control is maintained at some pre-defined foam height.

In the chart, we show the performance of these products, and two industry standards, using a synthetic black liquor. Black liquor is an alkaline digestion of pulp used in the making of paper and is an extremely difficult environment for foam control agents. Actives are 55 ppm.



SAFETY

Before handling, read the Material Safety Data Sheet and container label for safe use, physical and health hazard information.

THIS MATERIAL IS NOT FOR MEDICAL OR DRUG USE.

STORAGE AND SHELF LIFE

When stored in the original, unopened containers between 10 and 40°C, the products described herein have a shelf life of at least 12 months from date of manufacture.

PACKAGING

The products described herein are available in 20kg and 200kg containers.

LEGAL DISCLAIMER

Siltech Corporation believes that the information in this technical data sheet is an accurate description of the typical uses of the product. Siltech Corporation, however, disclaims any liability for incidental or consequential damages, which may result from the use of the product that are beyond its control. Therefore, it is the user's responsibility to thoroughly test the product in their particular application to determine its performance, efficacy and safety. Nothing contained herein is to be considered as permission or a recommendation to infringe any patent or any other intellectual property right.

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