ADDAPT Chemicals BV

for tomorrow's Technology

Foamstop™ VF 41N

Versatile Foam Control Agent

Technical Leaflet

for tomorrow's World

Foamstop™ VF 41N

Foamstop™ VF 41N is designed for optimal foam control during the grinding process of pigments and fillers. It also provides great defoaming properties for an extended period. Suitable for use in coatings and inks. Due to the unique formulation, versatile applications could be found with Foamstop™ VF 41N.

Benefits

- ✓ Highly effective defoamer for high shear dispersing processes
- ✓ Long term foam suppression
- ✓ Provides optimal defoaming properties during the mill base grinding, this improves the colour development properties
- ✓ Suitable for use in clear systems without giving surface defects
- ✓ Applicable to waterborne, solvent borne and ink systems
- ✓ VOC-free

Properties	
Chemical nature	Blend of vegetable oil with PAG's and surface active components
Appearance	Yellow to brownish liquid
Active content	~100%
Density at 25°C	0.95 - 1.05 g/ml
Viscosity at 25°C	400 - 1000 mPa·s
Applications	Pigment concentrates Paint and plasters Adhesives

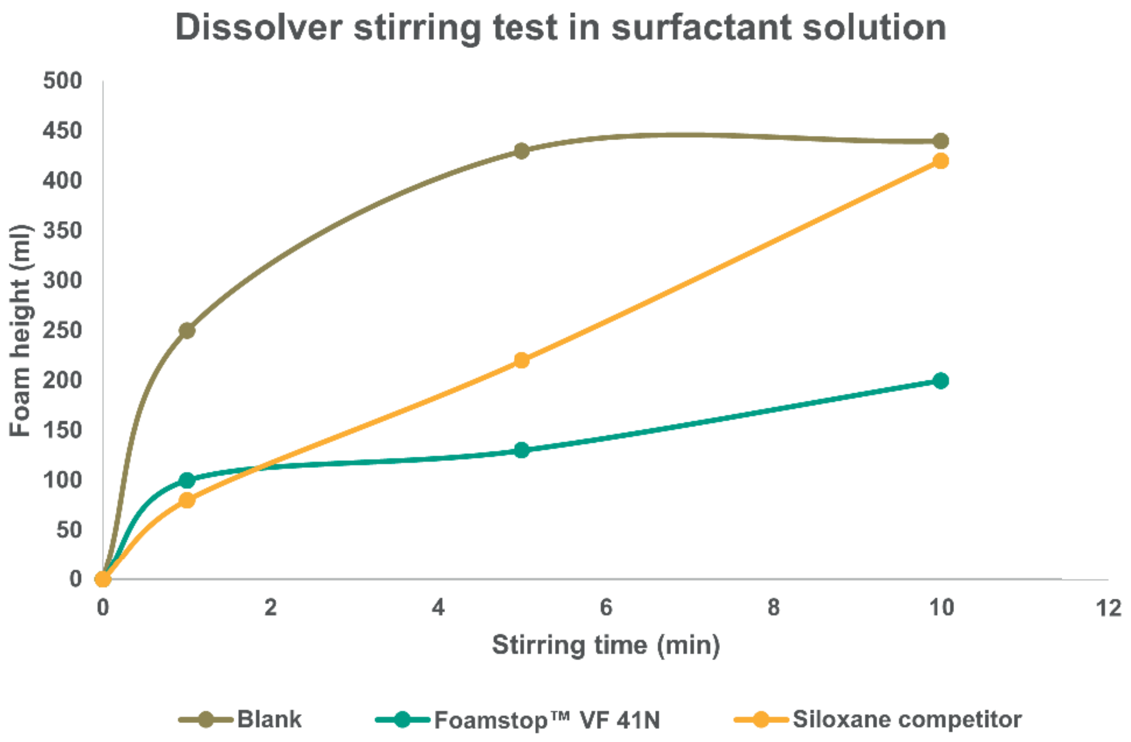
Defoamers work by disrupting the formation and stability of foam in liquids. They typically contain hydrophobic components that spread over the foam surface. This will weaken the liquid interface of the foam and cause them to collapse. Some defoamers are liquids with low surface tension, preventing new foam from forming.

As the defoamer works through several mechanisms, it is useful to have different test methods to evaluate specific properties of the defoamer. This technical leaflet presents the results of evaluation tests conducted to highlight various characteristics of Foamstop™ VF 41N.

Excellent defoaming in high shear applications

The dissolver stirring test provides insight into the defoam activity under continuously high shear application over an extended period. As high shear is applied, the defoamer droplets are broken into smaller droplets. These very small droplets lose their ability to break foam bubbles, as they become stabilised by the surfactant system.

A solution of 2.5% neutralised PEX™136m in demineralised water with 0.05% defoamer is stirred with a 3 mm toothed dissolver disc at 2000 RPM for 15 minutes. The test was paused after 1, 5 and 10 minutes to measure the foam level.



This test demonstrates the long-term foam suppression achieved by Foamstop™ VF 41N, while the modified siloxane-based competitor defoaming loses its effectiveness after a few minutes of testing. The loss of activity could be attributed to the compatibility of the modified siloxane defoamer and the surfactant solution. It is likely that the affinity of the small droplets with the surfactant solution is increased, resulting in reduced defoaming activity. In contrast, Foamstop™ VF 41N maintains its defoaming properties due to its chemical nature, which makes it less susceptible to be emulsified by the surfactant solution.

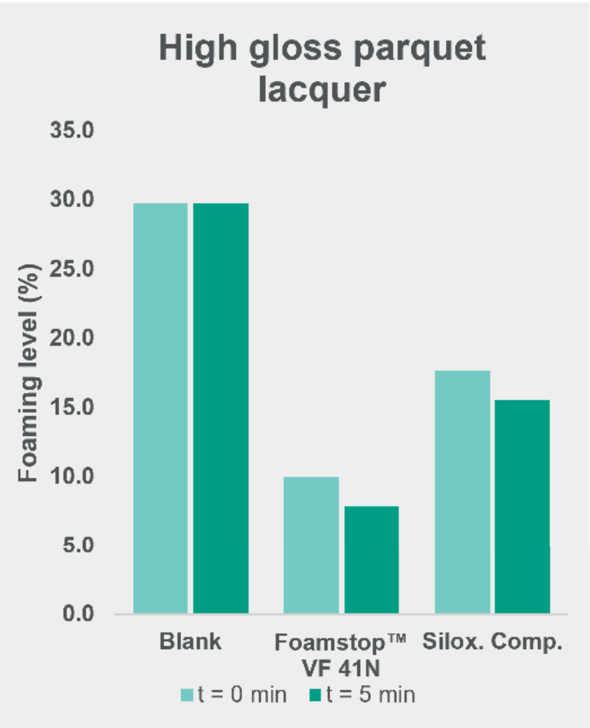
Defoaming in clear coat systems

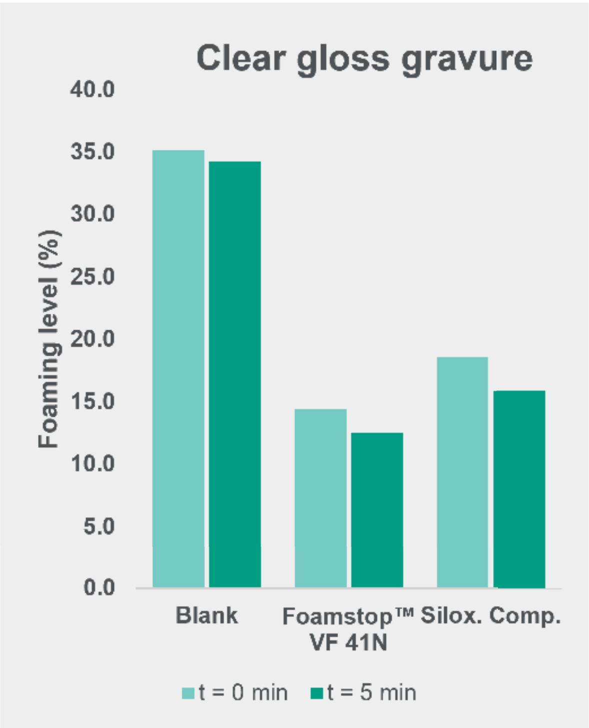
With the lacquer stirring test, the defoaming activity during dynamic and static conditions was evaluated. The defoaming performance typically depends on the process stage.. Under high shear conditions, the defoamer continuously moves through the liquid, promoting effective spreading and foam breakdown. However, when the solution is left undisturbed under static conditions, the defoamer behaves differently, as its ability to remain at the foam interface becomes crucial for an effective defoaming effect.

Defoamer (0.25%) was mixed into a diluted lacquer system and the density of the pre-test liquid was measured (Di). This solution was stirred with a propeller stirrer at 2000 RPM for 5 minutes. After stirring the density of the liquid was measured ($Df_{t=0\,min}$) and after 5 min of resting ($Df_{t=5\,min}$). The foaming level (after 0 min and 5 min) was calculated using the following formula:

$$\text{Foaming level (\%)} = 1 - \frac{Df_{t = 0 \text{ or } 5 \text{ min}}}{Di} \times 100\%$$

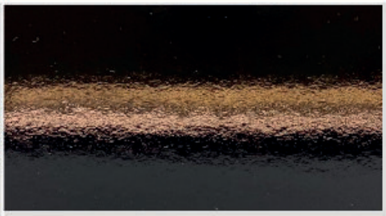
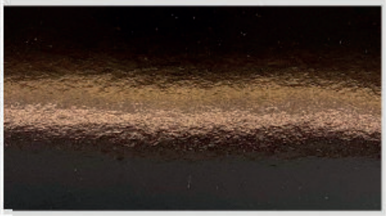
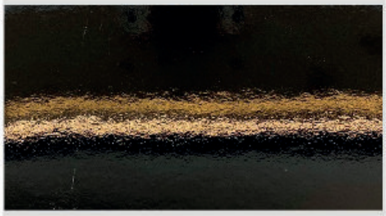
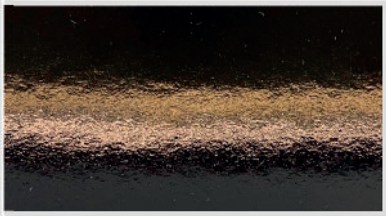
After density measurements, the lacquer was applied on a Leneta chart (Form 2DX) by brush. The film appearance and the presence of foam was evaluated.





The stirring test conducted with two clear lacquer systems showed a noticeable improvement in performance with **Foamstop™ VF 41N**, significantly reducing the foaming level. Additionally, the defoamer remained active even after resting for 5 minutes, with the foaming level continuing to decrease.

Evaluating the film appearance is crucial when working with clear lacquers. Siloxane- and oil-based defoamers often lead to surface defects, primarily due to the incompatibility of the defoamer with the lacquer formulation.

	High gloss parquet lacquer	Clear gloss gravure
Blank		
Foamstop™ VF 41N		
Siloxane competitor		

Lacquers containing 0.25% defoamer were applied by brush to a Form 2DX Leneta chart. Foam formation was clearly observed with the blank parquet lacquer, while the coatings with defoamer effectively prevented foam formation. No significant film defects were observed with **Foamstop™ VF 41N**, as could be seen by the reflection.

Defoaming during pigment grinding

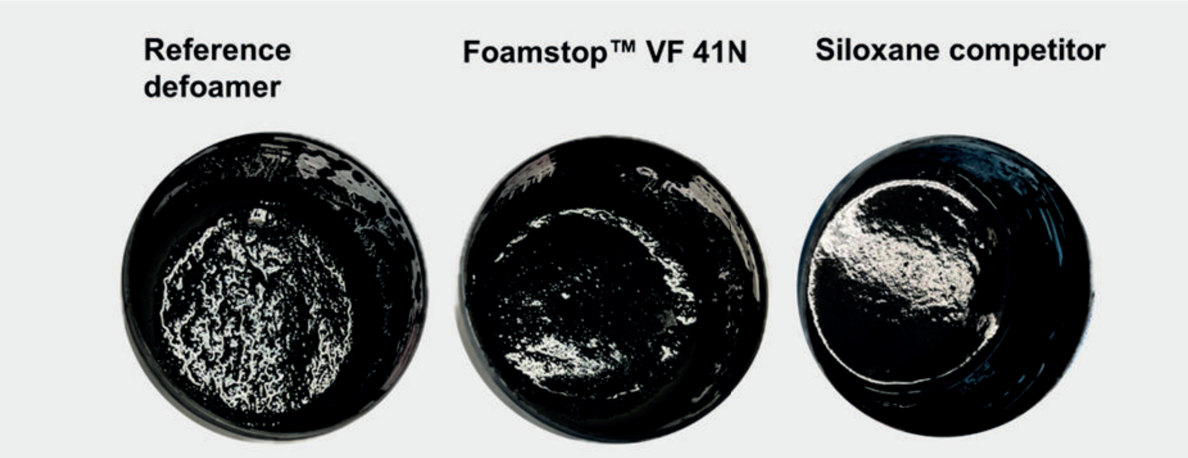
When defoamers are used in the pigment grinding process, the most effective way to evaluate their activity is by preparing an actual pigment paste. Pigment concentrates contain various components with complex interactions that are difficult to replicate in a defoamer test based on a surfactant solution. Upon high shear grinding, air is continuously incorporated, leading to foam formation. The presence of foam during this process can negatively affect flow properties. Additionally, foam in the pigment concentrates can impair pigment dispersion, as the air trapped around pigment particles reduces the shear forces acting on them.

Carbon black pigment concentrates

Carbon black pigments are known to cause foam issues during the pigment grinding process due to their high surface area, which traps and retains air during grinding and dispersion. To effectively disperse pigments into primary particles, high shear forces are often required, which also increases the risk of excessive foam formation. Defoamers are crucial in mitigating these foam challenges during the grinding of carbon blacks.

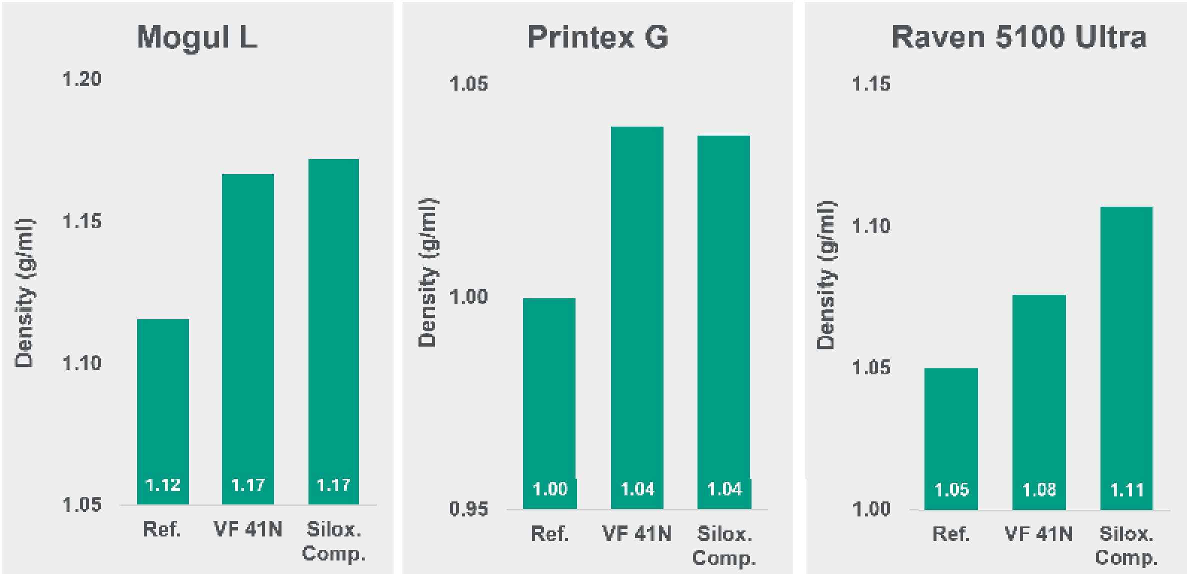
The test was conducted by preparing the pigment paste formulation (as shown in the table below), and the density of the paste was measured after preparation.

	Mogul L	Printex G	Raven 5100U
Demineralised water	40.0	35.2	22.1
ADDISP™ ECO	10.0	10.0	16.3
CODIS™ 95	0.6		1.0
Defoamer	**2.0**	**0.3**	**1.9**
PEG 200			10.1
Pigment	30.0	30	14.6
(Disperse 3000 RPM, 60 min)			
Demineralised water	17.3	24.4	34
Biocide	0.1	0.1	0.1
Total	100.0	100.0	100.0

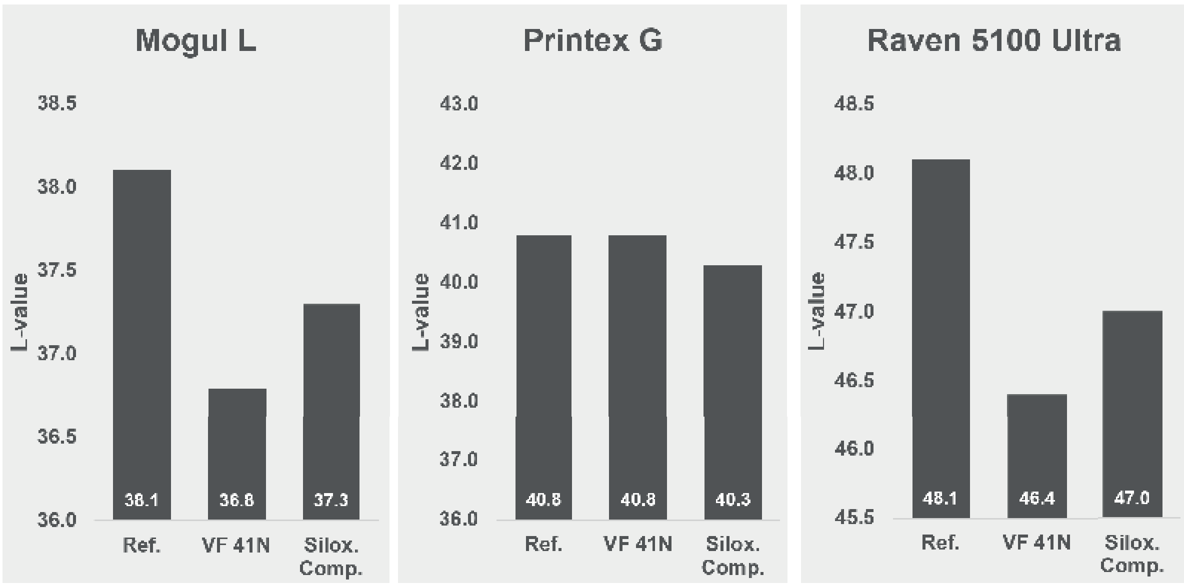


A high amount of entrapped air is visible in the carbon black pigment paste with the reference defoamer. With **Foamstop™ VF 41N** and the siloxane competitor, the amount of air is significantly reduced.

The density measurements correlated with the observations based on the appearance of the pigment pastes. The reference defoamer gave the lowest density in each carbon black formulation. A lower density indicates increased air incorporation. Foamstop™ VF 41N and the siloxane defoamer showed similar densities, demonstrating their ability to provide an efficient defoaming effect during the grinding process.



After preparing the pigment concentrates, the colour development of the pigment pastes was evaluated by mixing 1 part pigment paste with 19 parts white base paint (VA/VeoVa based). The colour was measured using an X-Rite RM-200 spectrometer using the CIE-lab coordinates. The lightness value (L*-value) measures the brightness or darkness of a colour, expressed by L*=100 white and L* = 0 black.



Foamstop™ VF 41N showed low L*-values (darker coating films) for each carbon black formulation. This indicates that the defoaming action of **Foamstop™ VF 41N** in the carbon black paste was more efficient. The enhanced defoaming action contributed to improved flow properties, allowing the pigments to be dispersed more efficiently.

CONTACT INFORMATION

ADDAPT Chemicals B.V.

Speltdijk 1
5704 RJ Helmond
The Netherlands

Tel.: +31 (0)492 59 75 75
E-mail: info@addapt-chem.com
http://www.addapt-chem.com

Liability
All recommendations for the use of our products, whether given by us in writing, oral, or to be implied from the results of tests carried out by us, are based on the current state of our knowledge. Under no circumstances shall Seller be liable for incidental, consequential or indirect damage for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with product(s). Seller's sole liability for any claims shall be Buyer's purchase price. Data and results are based on controlled lab work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has/have not been tested for, and is/are therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin or blood is intended, or for uses for which implantations within the human body is intended.