SIXIN®
Defoamers for Waterborne Coatings

For more than 27 years, SIXIN has helped its customers by perfecting their products and processes through the formulation of defoamers and antifoams that meet their specific needs. SIXIN was founded in 1992 by Dr. William Tsao in the city of Nanjing, China, with a focus on research and development, production and sales of defoamers and antifoams. In order to gain a global reach, the International Sales Offices was opened in Oregon in the United States.

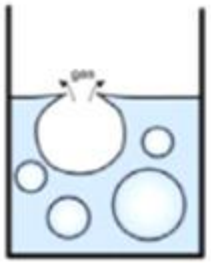
SIXIN has a worldwide presence with more than 2000 clients around the world (China, Europe, Africa, Southeast Asia, Australia, India, Russia, the Middle East and the Americas). Within its staff, it has more than 30 professionals of the Chemical Sciences and Engineering, collaborating with universities with the aim of providing the latest technology in defoamers and antifoams.

If your company has a specific challenge for foam destruction, we have the experience and laboratory capabilities to formulate a unique solution. SIXIN seeks to provide you with a professional, focused and specific service, assuring you that our products offer optimal performance and competitive prices.

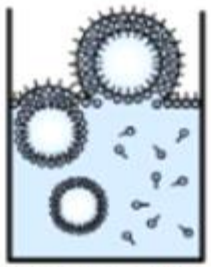
Foam Generation

Pure liquid vs. foam

- A pure liquid does not foam.
- The foam is a dispersion of gas bubbles in a continuous matrix (liquid or solid) stabilized by the action of a surfactant or by the viscosity of the matrix.
- The foam forms structures of defined geometries by unions that repeat their arrangement and morphology in different directions and sizes. These joints are contours of thin films of surfactant through which the continuous matrix circulates.



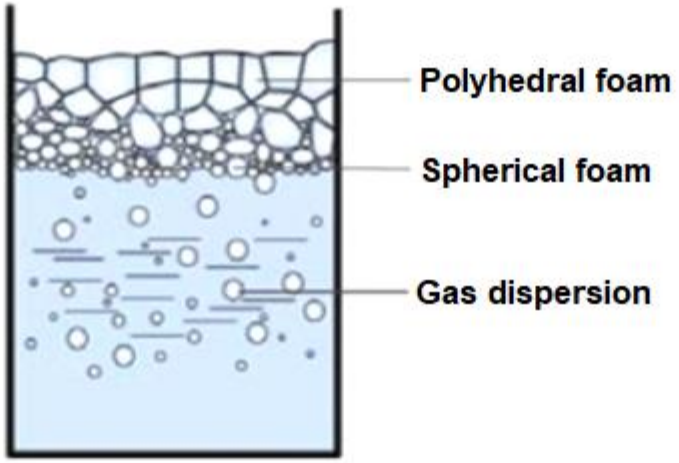
PURE LIQUID
A pure liquid does not foam.



LIQUID WITH SURFACTANT
Stable foam.

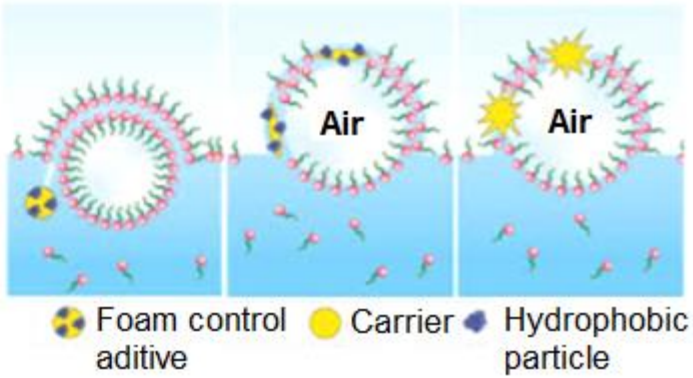
Foam stabilization mechanisms

- The bubbles must migrate to the surface to break.
- The drainage of the continuous matrix surrounding the foam bubbles leads to their rupture.
- Foam stability comes from a surfactant or surfactant films that prevent drainage, causing foam stabilization. It is at this point where the addition of foam control additives is required.



Defoamers' action

- Defoamers destabilize the foam by the following means:
  - They enter the surface of the foam bubble.
  - They extend along this surface and they thin the liquid film forcing the drainage of the matrix.
  - And finally, they join the liquid layers to break the bubble.
- This process is governed by surface tension.
- The surface tension of the defoamer drops should be lower than that of the continuous matrix.



SIXIN Defoamers for waterborne coatings

Vegetable oil-based defoamers

- Formulated with renewable materials, this type of defoamers are increasing their presence in waterborne formulations.
- They are used in architectural paints and other sectors.
- Recommendation: 9937D.

Silicone defoamers (polysiloxanes)

- PDMS and modified-PDMS (via modification with polyethers or other polymers) have very high spreading characteristics.
- Applications include pigmented and unpigmented wood paint, architectural and industrial coatings and printing inks.
- Recommendations: 991629 & 998803.

Mineral oil defoamers

- Mineral oils are frequently used in the architectural paints and printing inks sectors.
- Mineral oils frequently reach their limits since they tend to impair gloss or cause other surface effects.
- Recommendations: CS-502CW, CS-04B & CS-07BW.

Waterborne coatings defoamer evaluation

Roller test

- This test is used to simulate real applications conditions.
- The paint is applied with a roller to a substrate.
- Surface defects caused by foam are evaluated in the dried paint film.

Stir test

- Air is stirred into the waterborne formulation with a high shear mixer.
- The freshly foamed formulation is poured onto a weight per gallon cup to measure density.
- The control is compared against the sample with defoamer.

Drowdown test

- Black and white cards are used for testing coatings through wet film preparation.
- Once the film has dried, assessments of the surface defects are performed.

Methods of incorporation

Defoamers presentations are mostly as emulsions or concentrates:

- In emulsions, the active chemicals are already finely distributed in a liquid media, therefore, they can be incorporated in the waterborne formulation using relatively low stirring intensity.
- Concentrates consist closely to 100% of the active ingredient. They are water-free or solvent-free.
    - In concentrates, optimum size droplets must first be generated. The incorporation of the concentrate is achieved using high shear forces.
    - The shear rate can directly influence the effectiveness of the defoamer. Low shear rate will results in large defoamer droplets and will cause surface defects. Extremely high shear rate will results in small droplets causing that the defoamer will not reach full effectiveness.

Therefore the best criteria for choosing a defoamer are the type of formulation, internal evaluation method and incorporation method.

Key features of SIXIN defoamers for waterborne coatings

- Good compatibility with waterborne systems (coatings and inks)
- Stable during long storage periods.
- Persistent foam control.
- Contact your SIXIN sales representative for technical data sheets and samples for evaluation.

SIXIN defoamers for waterborne coatings

	9937D	CS-502CW	CS-04B	CS-07BW	991629	998803
Chemistry	Vegetable oil	Mineral oil			Silicone	
Appearance	Light yellow to brown cloudy liquid	Light yellow to brown oily liquid			Colorless liquid	White or yellowish uniform liquid emulsion
Viscosity (25 °C, mPa·s)	100-200	300-500	100-400	50-100	50-300	200-500