WHY DEFOAMERS?

During the dispersion process, air is introduced into the paint through mixing or released when pigments and fillers are wetted.

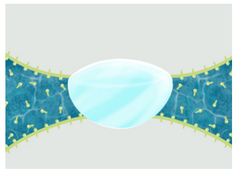
Defoamers are used to prevent unwanted foam as they destabilize the foam lamella and cause the bubbles to burst.

HOW DEFOAMERS ACT

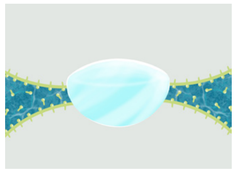
For a defoamer to develop its optimum effectiveness, it must be insoluble in the formulation to be defoamed and compatible to prevent surface defects during application.

Another requirement is a positive penetration coefficient so that the defoamer drops can penetrate the foam lamella and the liquid/air interface. The entry barrier increases with higher surfactant content.

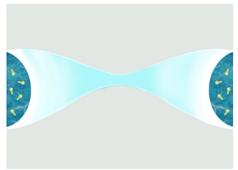
Defoamers use various mechanisms to be effective. For instance, using a **"bridging" mechanism**, the defoamer drop breaks through the foam lamella on both sides. This is followed by a "dewetting" or "stretching" mechanism which causes bubbles to burst.



Bridging mechanism: Defoamer drop breaks through the foam lamella on both sides.



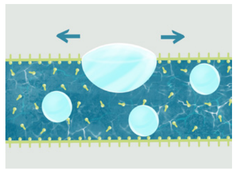
Dewetting of the defoamer drop.



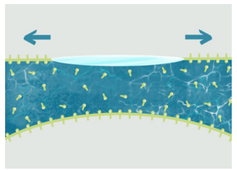
Stretching of the defoamer drop.

Another defoaming mechanism is known as the **"spreading" mechanism**. After penetrating the liquid/air interface the defoamer drop spreads at the interface and displaces the surfactants. The former elastic foam lamella is replaced by a film with lower cohesive forces.

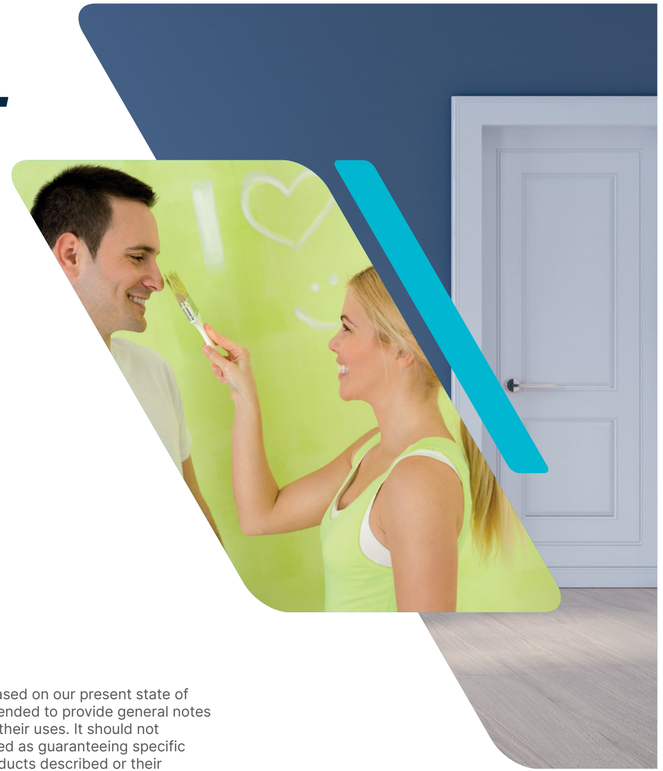
The entry barrier is reduced and further defoamer drops enlarge the surface of the spread film. The spreading leads to a flow in the foam lamalla which causes it to become thinner until it bursts.



Spreading mechanism: The defoamer drop spreads at the interface.



Thinning of foam lamella as a result of spreading.



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Creating impact for a better future

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DEFOAMERS
FOR WATER-BASED PAINTS

As a leading global chemical manufacturer, ICL's R&D team is continuously developing industrial solutions to manufacture safe, high-quality products for the paints and coatings industry.

The LOPON® E defoaming agents are highly effective products for defoaming water-based formulations. In order to meet the growing need for sustainable and eco-friendly products, most of our solutions are based on bio-renewable raw materials and are free of volatile organic compounds.

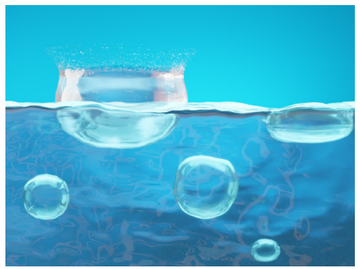
Creating impact for a better future

FOAM

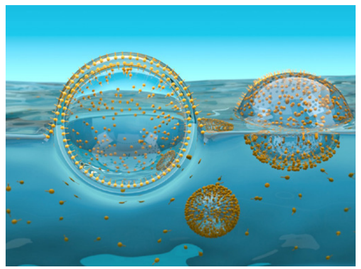
Foam is the inclusion of gas bubbles in a liquid medium. While gas bubbles in pure liquids migrate rapidly to the surface and burst, the surface-active substances used in paints and varnishes stabilize them.

Stabilization occurs when surfactants cover the surface of gas bubbles with their hydrophobic end while the hydrophilic side of the surfactant molecule extends into the aqueous phase. Surfactants are also arranged on the surface according to their hydrophobicity / hydrophilicity.

When a stabilized gas bubble rises to the surface, it is stabilized there by a surfactant double layer.



Migration to the surface and bursting of gas bubbles in pure water.



Stabilization of gas bubbles in a liquid containing surface-active substances.

Manufacturing processes are negatively affected by stabilized foam. Shear forces necessary for dispersion are transmitted less efficiently, resulting in poor dispersion quality for the pigments and fillers.

As a consequence of volume increase in an uncontrolled manner with foam present, a drastic decrease in density results. Reproducible and reliable production and the accurate filling of containers are another problem caused by trapped foam.

Foam also entails problems during application. Surface defects in a dried paint film which are not only unaesthetic result from foam with a further potential for decreased protective performance.

Dispersing without defoamer: Foam is formed and increases volume in an uncontrolled manner.

Dispersing with 0.2 % LOPON® E 81. Foam forming is strongly reduced.

OUR PORTFOLIO

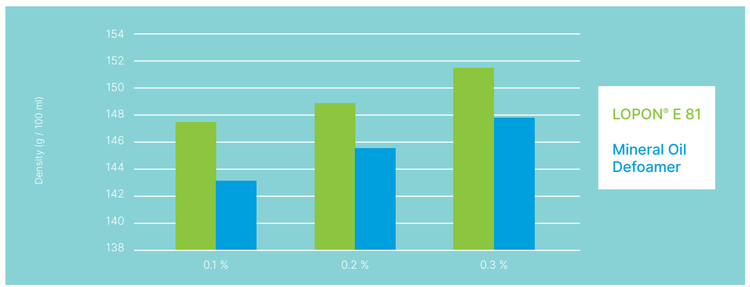
Product	Chemical basis	Viscosity [mPas]	Low VOC	Mineral oil free	Silicon free	Renewable raw materials [%]	Application
LOPON® E 13	Vegetable oil	3500 - 5000	✓	✓	✓	93	Low viscosity systems
LOPON® E 71	Polymer	3000 - 9000	✓	✓	✓	2	Glossy paints
LOPON® E 81	Vegetable oil	3000 - 9000	✓	✓	✓	47	Universal
LOPON® E 100	Fatty acid esters	500 - 2000	✓	✓	✓	85	Glossy paints, varnishes
TARGON® P3	Vegetable oil	Powder	✓	✓	✓	26	Powder systems

Our LOPON® defoamers show a high level of effectiveness when used at low dosage levels.

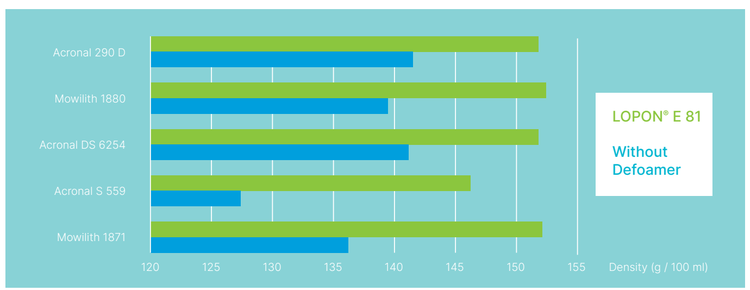
For a comparable defoamer effect, a lower dosage of LOPON® E 81 is usually necessary when compared to a traditional mineral oil defoamer.

LOPON® E 81 is quite versatile due to its wide range of effects.

In addition to our liquid defoamers we also offer a powdery defoamer for use in powder systems.



Exterior paint: With a dosage of only 0.1 % LOPON® E 81, a comparable effect is achieved as with 0.3 % of a conventional mineral oil defoamer.



Effectivity of LOPON® E 81 in different binders: density in g / 100 ml of emulsion paint.

SUSTAINABLE AND ECO-FRIENDLY

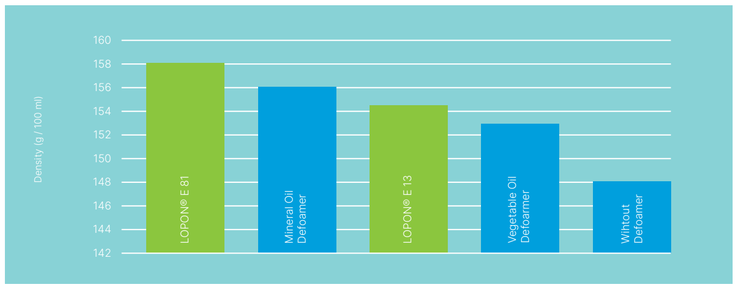
While in earlier days mainly mineral oil-based defoamers were used, today increasing emphasis is placed on sustainability. Many of our LOPON® defoamers are based on renewable raw materials which are biodegradable.

LOPON® E 81 has a percentage of renewable raw materials of 47 %.

Even more environmentally friendly is our defoamer LOPON® E 13. LOPON® E 13 has a content of 93 % of regrowing materials.

Compared to our defoamer LOPON® E 81, the effectiveness is slightly reduced but still comparable or even better than biodegradable defoamers from competitors.

All our LOPON® and TARGON® defoamers have been developed for water-based applications and are suitable for Ecolabel compliant formulations.



Effectivity of LOPON® E 13 compared to different defoamers in a semi-gloss paint with a dosage of 0.3 %

FURTHER PRODUCTS

In addition to defoamers, we also offer dispersing agents and stabilizers specially for silicate paints and biocide-free paints under the brand names, **LOPON®** and **POLYRON®**. We would be glad to advise you here as well.

You can find our versatile additive selection for the construction industry under the brand name **TARGON®**.

ICL also has an extensive portfolio of organic and inorganic corrosion inhibitors as well as flash rust inhibitors. The **HALOX®** product line is supplemented by tannin stain inhibitors.

For more information, please visit our website **www.halox.com** or contact us directly at **coatings@icl-group.com**

We look forward to helping you!