



## **Defoaming and antifoaming agents for paint industry**

**also known as defoamers, antifoamers or deaerators. This is a group of auxiliary preparations which, when applied in small amounts, beneficially influence the quality parameters of paints simultaneously facilitating the process of their production and packaging of ready products.**



The process of producing paints is complex. It involves an intense mixing of components particularly at the stage of grinding pigments and fillers. Foaming properties of some components are the reasons for generating foam, which results in a series of technical problems during the production process of the paint and its packaging. The most frequently-occurring negative consequences of foaming in the setting indicate problems with efficient dispersing of pigments and fillers as well as problems with pouring paints into single packagings. Another problem is linked with the quality of the coat. Small air bubbles in the paint hinder painting and significantly worsen the durability of the coat. Small holes and craters formed after the paint is dry spoil the aesthetics of the final painting, weaken the durability of the paint and at the same time worsen its protective parameters.

Applying an appropriately-selected defoaming agent is the guarantee of getting high quality coats and avoiding problems during the production process of the paint. The selected defoamer should remove the air from pigments and filler fast and efficiently and counteract foaming during dosing and distribution of different components in the setting. In particular, this applies to polymer dispersion which is often characterized by strong foaming properties.

There are a few types of defoaming preparations on the market based on different chemical bases. The most important are:

Mineral oil based defoamers. They are mixtures of different active components in which the basis and the carrier is mineral oil. They are mainly recommended for decorative matt and semi-matt paints as well as for various types of polymer plasters. Their action depends on the kind of active components and their concentration. Such mineral oil based defoamers may often have a negative influence on the paint gloss. They also tend to separate on the coat surface; therefore they should not be applied in varnishes, gloss enamels and low viscosity primers. These defoamers are in oil form as well as in the form of water emulsions.

Silicone defoamers are usually used in high-gloss varnishes, enamels, industrial paints, printing inks, primers etc. They are often based on organically-modified polydimethylsiloxanes and therefore show better compatibility and are characterized by better deaerating properties. They are usually in water emulsion form, which makes them easier to apply.

Polymer defoamers do not contain mineral oil or silicone. They are a 100% concentrate of active components. They are characterized by a very high activity but also are grouped in the range of more expensive products. Often applied in high-quality paints in which other defoamers are not efficient enough.

#### Laboratory methods of testing effectiveness of defoamers

Matching the defoamer for a given paint should be made according to a proper method which should reflect the production conditions and render the application conditions of the paint.

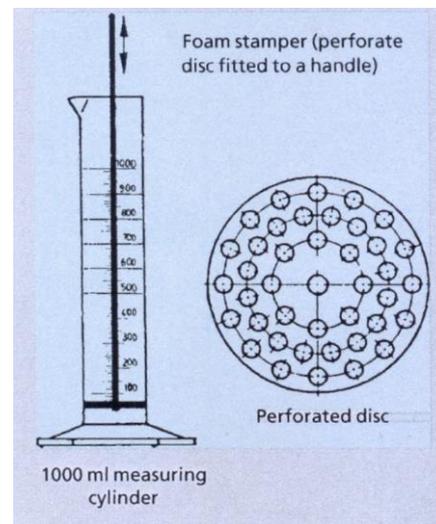
Paint producers often face a problem of choosing the right agent, while having at least several samples of defoamers in their laboratories. Theoretical guidelines in specifications usually are not sufficient and may serve only for the initial selection. In practice, it is necessary to conduct laboratory tests. Below are briefly presented and described such preliminary tests.

For conducting such tests, it is necessary to have the paint to be tested which cannot contain defoaming agents additives. In this paint the tested defoamers are added in narrowly defined conditions so that they can assure maximum repeatability of the results.

#### Antifoaming activity evaluation

The paint with the tested defoamer is poured into plastic cylinders and aerated in a special device equipped with two perforated discs fitted to a handle. The discs move back and forth for the whole height of the paint sample in the cylinder. After performing the cycle of 'compressing' the measurement of paint density is done with a metal pycnometer. The measure of anti-foaming activity of a given preparation is the density of the paint after the cycle of aerating the

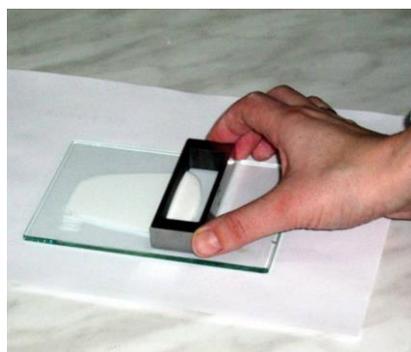
sample. The higher density of the paint indicates its lower level of aeration, which means a better activity of the anti-foaming preparation. The test can be done manually having a glass cylinder and a metal stamper. The paint can also be aerated by using a high-speed mechanical stirrer or a shaker. The measuring principle will be similar.



### Testing compatibility of the defoamer with the paint and determination of application parameters.

The coat of the tested paint containing the tested defoamer is applied on a glass plate or another surface with an applicator. After the coat has dried it is assessed for defects (fish eyes, craters and holes). The ideal result of the applied defoamer is when it does not cause any defects of the coat which could affect its aesthetics and quality parameters.

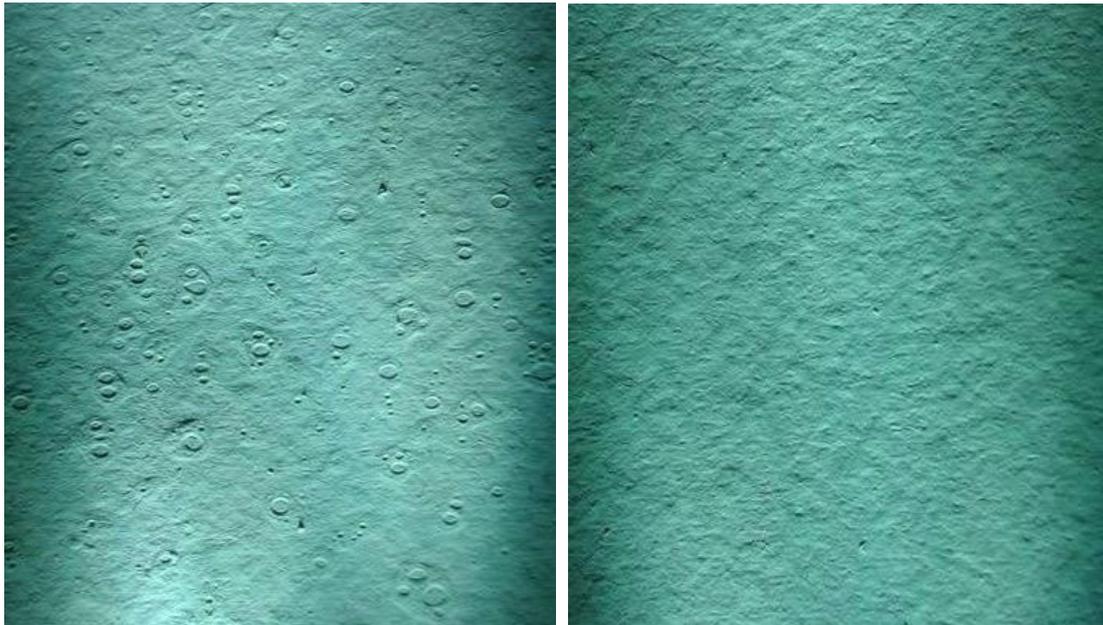
Application tests are about painting a layer of paint onto a primed gypsum board or another surface depending on the use of the paint. This activity should be performed in a well defined manner using a porous roller. While painting, the time of disappearance of bubbles is measured and after the coat has dried, the final painting is assessed in terms of micro and macro foam.



Compatibility test



application test

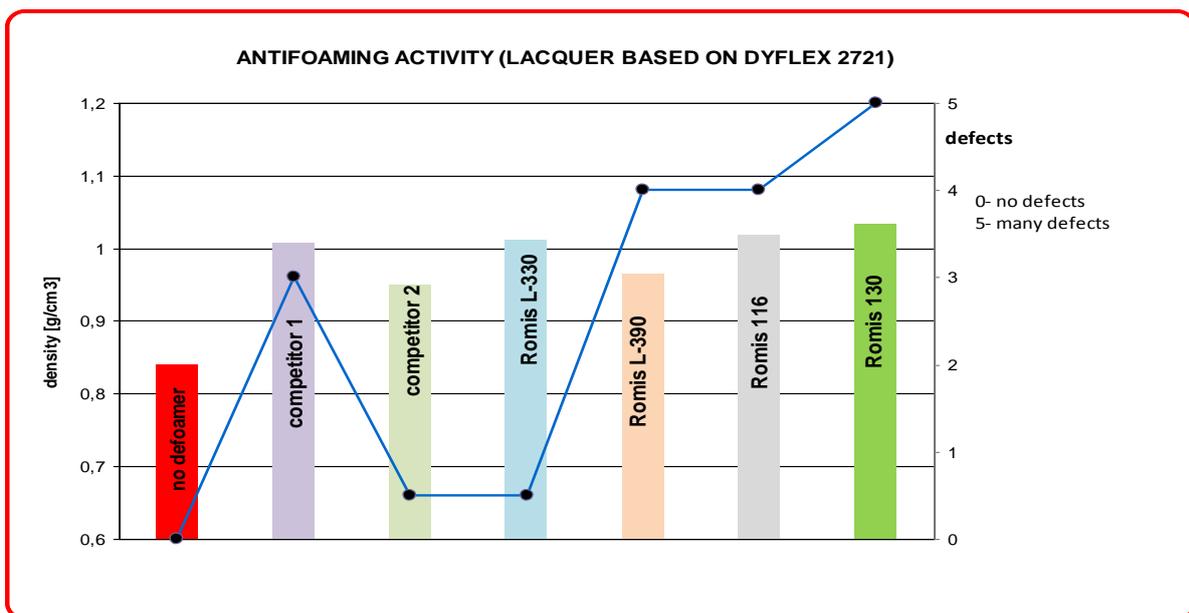


Competitive product (0,2%)

Romis T-218 (0,2%)

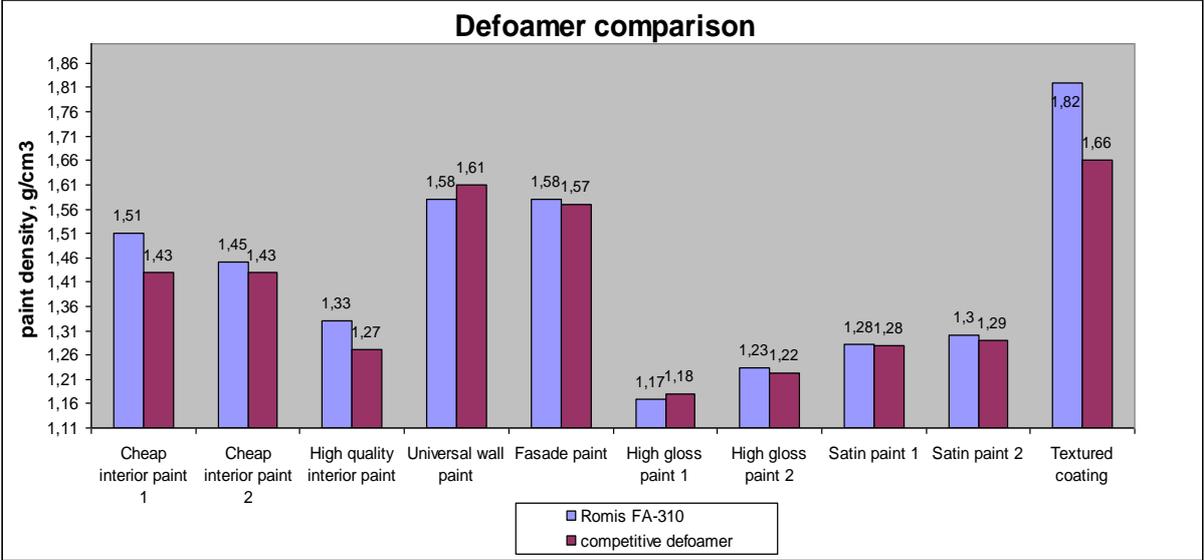
The presented tests serve only for choosing one agent from many available ones on the market. The tests do not include industrial conditions in which defoamers are added on a two-stage basis, i.e. at the stage of pigments and fillers grinding as well as at the end of the process. Some defoamers may be deactivated during grinding of pigments and fillers; this fact should be taken into consideration during preliminary tests particularly at the direct process of paint preparation from the beginning.

Below are presented the tests results conducted by Rowis-System at the example of matching appropriate defoamer with the varnish based on polyurethane-acrylic dispersion Dyflex 2721 intended for wood.



As it can be seen in the diagram, the silicone defoamer **Romis L-330** offers high density and good compatibility therefore it is an optimal agent for the tested varnish.

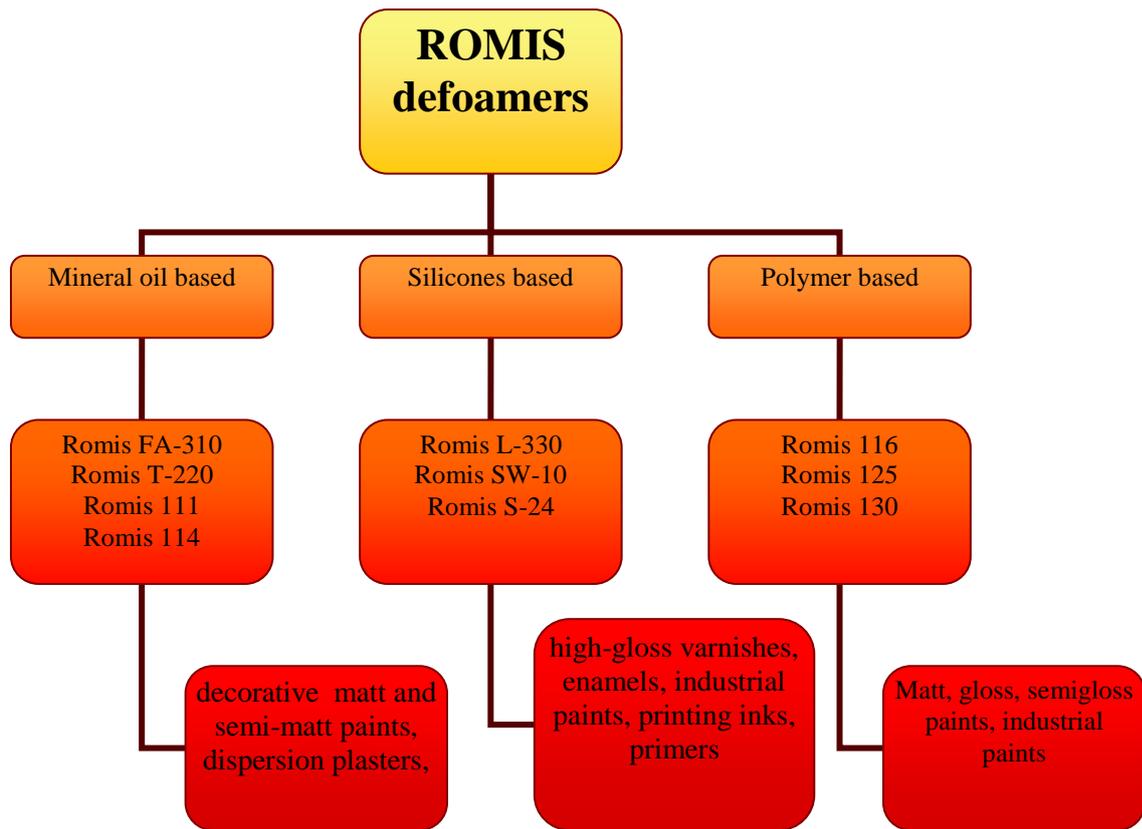
Another example is the results of the comparative test between the popular competitive ,oil' defoamer and **Romis FA-310** presented below. These tests were conducted on various paints. In most cases Romis FA-310 offered a higher density of the paint after aeration, which reflects its better efficiency. Romis FA-310 may be used as a universal defoamer in both matt paints and polymer plasters. It has been confirmed by laboratory test and our clients' opinions.



Due to the fact that the process of matching defoamers is time-consuming, Rowis-System company offers clients conducting the presented tests in its own laboratory. It allows clients to save time and minimize the risk of matching an inappropriate agent.

In cases when conducting laboratory tests is not possible directly on the real-life setting, when matching the agents one can use the criteria presented in the diagram below in which the most popular defoaming agents of Rowis-System are contained.

The process of matching appropriate defoamers is not easy and requires individual approach to each setting. The majority of additive producers after many years of experience in the branch conclude: ,There are no universal defoaming agents'. Each setting is an individual mixture of many components characterized by different physico-chemical properties. The process of matching should be done individually for each setting and be based simultaneously on several methods. The final verification should be conducted at any time in industrial conditions at the client's.



Rowis-System company specializes in designing and producing defoaming and anti-foaming agents for many branches of chemical industry. It has a research and development facility and an application laboratory where new agents are designed and tested, and tests for clients are conducted.

All our products are based on our own technologies. As the only producer we offer our clients not only the product but in the first place technical support and guarantee that the clients will not be left alone with problems and therefore we have been cooperating with them for so many years.

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