



Is it a nonionic, a cationic or an amphoteric surfactant? Is it possible for a surfactant to raise this kind of question? Yes, if you think about amine oxides.

This very versatile surfactant is used in many different applications, from Personal Care to textile industry, from Industrial & Home Care to polymers processes, due to its many advantages,

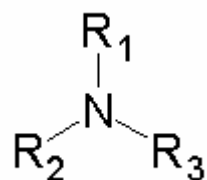
Now imagine an amine oxide that, apart from presenting all the usual benefits, also presents an improved degreasing performance. Wouldn't it be the ideal choice for cleaners?

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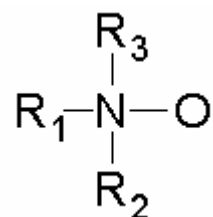
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Traditional amine oxides

Technically speaking, amine oxides are the result of the oxidation of tertiary amines. In other words, you have a tertiary amine like the one below:



And you oxidize it, usually with hydrogen peroxide, and you have the amine oxide:



It is usually classified as a nonionic surfactant, as it does not have any formal charges. However, sometimes it is also classified as cationic, as under pH below 3 it is protonated, and the nitrogen receives a formal positive charge. And some authors also classify it as an amphoteric surfactant due to the strong dipolar moment between the oxygen and the nitrogen, almost as if there was a positive charge on the nitrogen and a negative charge on the oxygen. But formally speaking, under neutral or alkaline conditions it does not present any formal charges, and therefore is a nonionic.

The most common amine oxides in the market are variations of the Alkyl Dimethyl Amine Oxide:



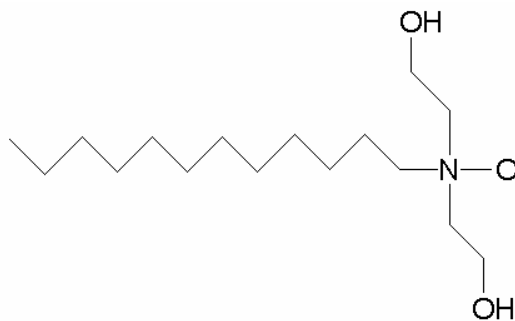
This amine oxide presents many interesting properties, such as thickening of surfactant solutions (the strong dipolar moment helps to structure the surfactant phase), boosting and stabilizing foam, increasing resistance to oxidation and skin compatibility.



Due to those characteristics, it is broadly used in shampoos, hand dishwashing liquids and cleaners, as well as in other areas such as the textile industry as antistatic agents, in polymer process and in anti-corrosion formulations.

The Genaminox[®] CHE

The Genaminox[®] CHE is from a different generation of amine oxides. Different from the traditional Alkyl Dimethyl Amine Oxide, it comprises two hydroxyethyl groups instead of the methyl groups. In other words, the Genaminox[®] CHE is an Alkyl Dihydroxyethyl amine oxide:



This two hydroxyethyl groups make the Genaminox® CHE a much more efficient surfactant for cleaning and degreasing. Without losing the properties from traditional amine oxides, it now is capable of really boosting the performance of cleaning systems.

A Green Product

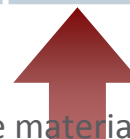
Genaminox® CHE is part of Clariant's EcoTain portfolio, meaning that it presents many properties in line with the global green trend.



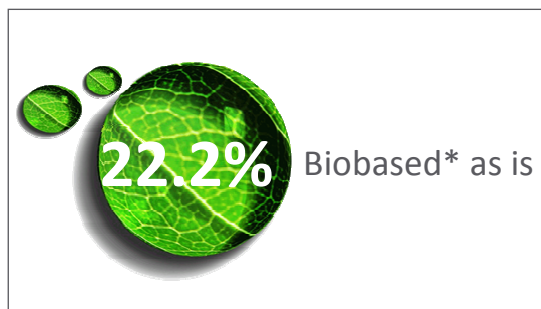
Like most amine oxides, it is readily biodegradable under aerobic conditions. Moreover, its hydrophobic part, the C-chain, representing around 60% of the whole mass, is made from a renewable source, making the Genaminox® CHE a 60% biobased material.

Finally, the concentration of active material of Genaminox® CHE is around 37%, which is approximately 23% more concentrated than regular amine oxides that usually reach 30% at most. This higher concentration means less transportation and storage costs, and also allows more concentrated formulas, all helping to preserve the environment.

	Chemistry	Activity
Standard Amine Oxide	Lauryl dimethyl amine oxide	~30%
Genaminox® CHE	Dihydroxyethyl amine oxide	37%



23.3% more active material than dimethyl amine oxide



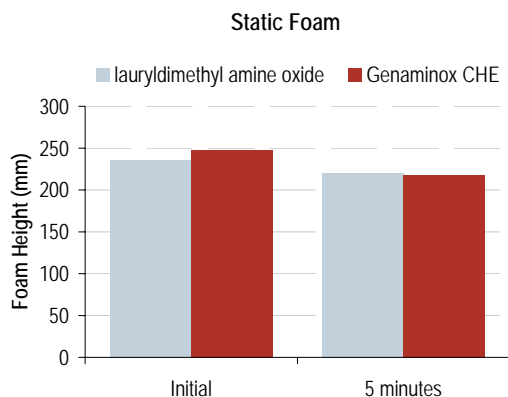
* According to ASTM Definition Section 9002 of Subcommittee D20.96

Performance

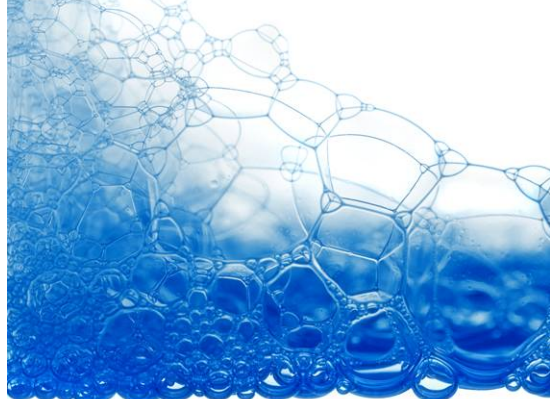
Genaminox® CHE presents the same properties of the standard amine oxides, with the addition of being a much better degreasing and cleaning agent.

Static Foam

The static foam performance is measured by the Ross Miles Test. The higher the foam height, the better the foam generation. And the smaller the decrease after 5 minutes, the more stable.



The foam generation of Genaminox® CHE is slightly better, and the stability is the same as the standard amine oxide.



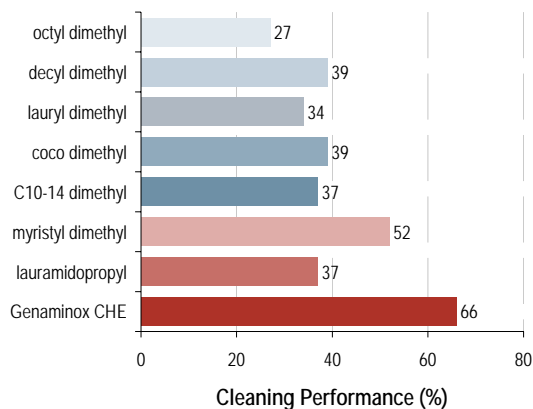
Cleaning Efficacy

The Cleaning Efficacy Test is performed on a vinyl composition tile (VCT). This kind of substrate is used because the soil adheres well to VCT and is not easily rinsed or wiped away without the use of a cleaning solution.

The tested soil is made of:

Cleaning Efficacy - Soil Composition	
Component	Weight %
Low Boiling Point Petroleum Ether <i>petro-based solvent</i>	40.5
Soybean Oil <i>high linoleic acid content</i>	10.8
Canola Oil <i>high oleic acid content</i>	36.7
Carbon Black <i>particulate</i>	12.0

The white VCT tile with soil is scrubbed with a 1% cleaning solution & sponge for 20 strokes. After that, colorimetric readings are made and the cleaning performance is calculated.



As it can be seen, the Genaminox® CHE consistently outperforms other amine oxides.

Conclusions

Performance tests were also made with Antibacterial cleaners, green cleaners and bathroom cleaners, and for all those cases, and under the test conditions shown before, the performance of Genaminox® CHE was better than the performance of standard amine oxides and even better than other surfactants such as alcohol ethoxylates and Alkylpolyglucosides.

To sum up, Genaminox® CHE is:

- **An excellent hard surface cleaner:**
Genaminox® CHE performs well in the heavily particulate laden, heavily oil based, and soap scum cleaning tests.
- **A strong emulsifier:**
Genaminox® CHE emulsifies soil on contact.
- **A very effective surfactant:**
Genaminox® CHE outperforms lauryldimethyl amine oxide and nonionic surfactants.
- **Peroxide stable:**
Great for peroxide based cleaners.
- **Ecological:**
Biobased - natural alternative.
- **Economical:**
High active matter which results in less storage/transportation costs and makes it highly suitable for concentrated formulas.





General Highlights

News and information on Clariant and
the Industrial & Home Care market

TexCare® SRN 240

The TexCare® SRN 240, presented in the IHC News issue 6 launched one year ago, in July 2009, has passed through an evaluation by NSF and is now being recommended for taking part on CleanGredients® list as ultimately biodegradable (>70% in 28days), and with an acute aquatic toxicity level of >100 mg/L (based on data for a single species).



NSF® International, The Public Health and Safety Company, a not-for-profit, non-governmental organization, is the world leader in standards development, product certification, education, and risk-management for public health and safety.



CleanGredients® is an online database of cleaning product ingredients that meet established requirements for superior environmental and human health performance. It helps formulators and suppliers by showcasing chemicals with potential environmental and human health benefits.

DEET

DEET, which was presented on IHC News issue 5, from April 2009, was considered the most effective repellent active in a test made by Stiftung Warentest, a foundation that tests consumer products. The best product in the test was the "anti Brumm", which contains DEET.

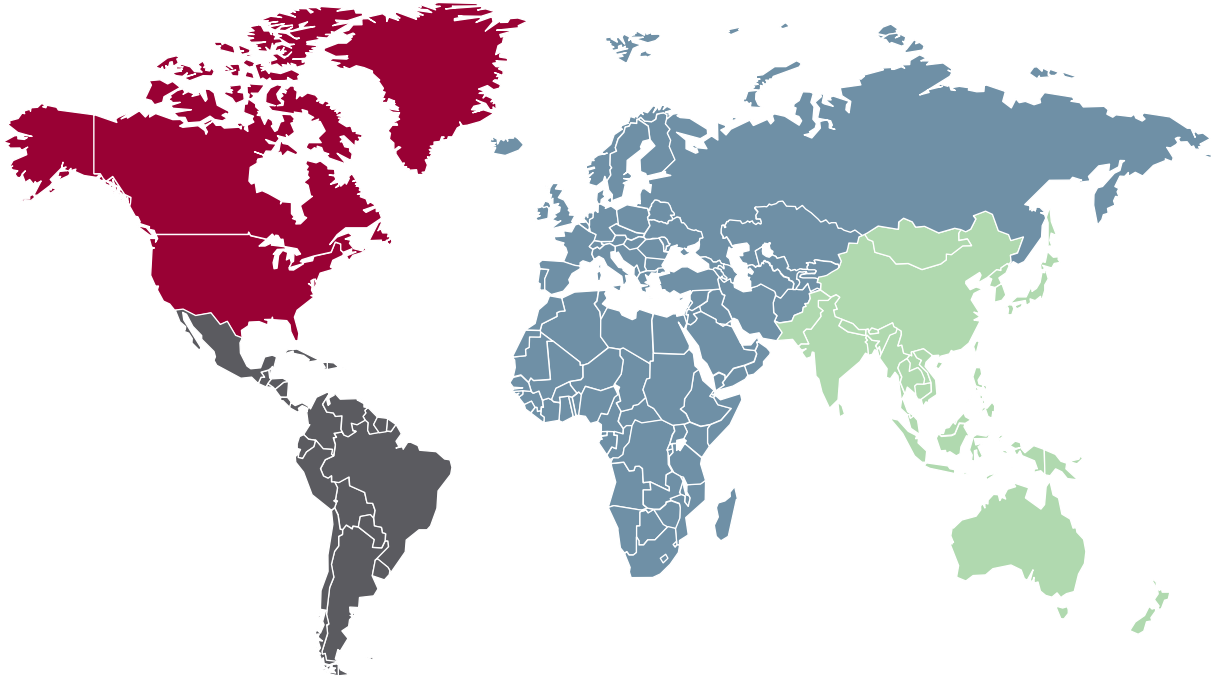
Moreover, only the DEET containing products achieved a "sehr gut" (excellent) remark in the *Insect Repellency* category, and among the 6 best products ranked with "good", 3 contained DEET.



The Stiftung Warentest was created in 1964 by a resolution from the German Government in order to offer independent and objective opinions about goods and services to the consumers through comparative tests.

Stiftung Warentest has such a credibility that companies use their results as promotion material by putting on the labels "**Stiftung Waren test 2010 sehr gut**", meaning "**tested by Stiftung Warentest, test result excellent, year 2010**".

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