

WE SEE BLUE SKIES AHEAD.

EPOLEON®

ODOR NEUTRALIZING AGENTS



INTRODUCTION

As we see it, you are looking for a way of controlling odors that works as safely as it does effectively. Using progressive technology, Epoleon Corporation has met this challenge in the development of a superior product line of organic odor neutralizers. Our formulas offer a revolutionary alternative to the use of masking agents.

Epoleon concentrated water-based products are comprised of all-natural, non-toxic and biodegradable compounds. Each formula is designed to chemically react, to varying degrees, with particular types of gases and is available in fragrant or fragrance-free formulas. For maximum results, simply choose the formula(s), which work most effec-

tively on the types of odors you intend to neutralize.

Epoleon can be used at full concentration or diluted up to 200 times depending on the situation and method of application. In essence, our products can be custom fit to meet the specifications and capabilities of individual plants and facilities.

In today's climate of ecological awareness, we are proud to offer products that control odors in an environmentally responsible and enhancing way.

HERE IS HOW EPOLEON WORKS

Through methods of chemical reaction, counteraction and absorption, Epoleon formulas neutralize odorous gases upon contact. Here are four examples of how Epoleon converts obnoxious, often problematic gases into stable, non-harmful and odor-free compounds.

Deodorization process for Epoleon N-100 and N-7C formulas

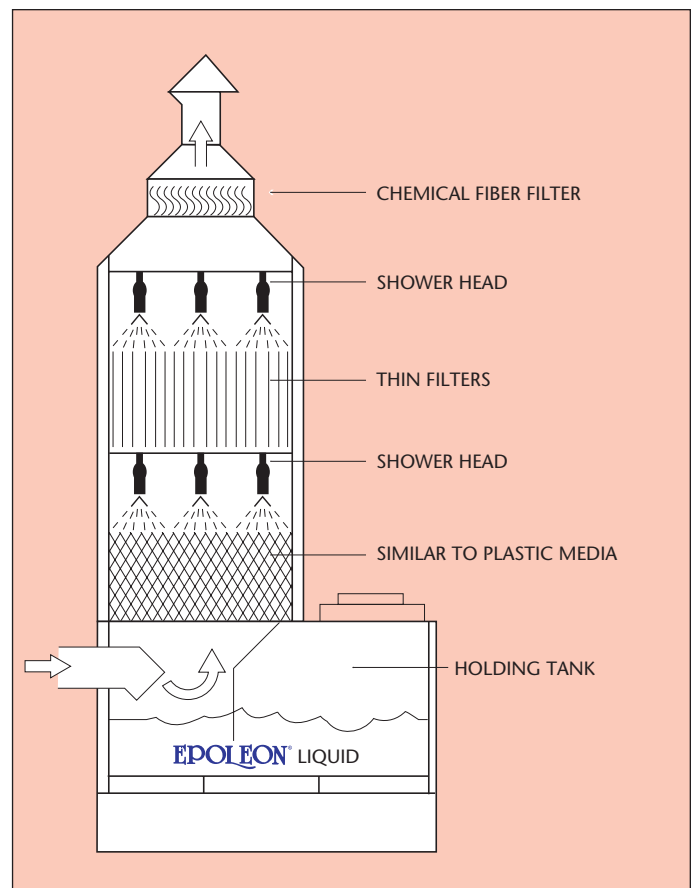
1. Ammonia(NH₃)
 $-CH_2COOH + NH_3 \longrightarrow CH_2COONH_4$
2. Trimethylamine(CH₃)₃N
 $-CH_2COOH + (CH_3)_3N \longrightarrow CH_2COONH(CH_3)_3$
3. Hydrogen Sulfide (H₂S)
 $-CH_2COONa + H_2S \longrightarrow NaHS + -CH_2COOH$
4. Methyl Mercaptan(CH₃SH)
 $-CH_2COONa + CH_3SH \longrightarrow CH_3SNa + -CH_2COOH$

SCRUBBER SYSTEMS

Formula: N-100 and/or N-7C

Dosage Rate: .01% to 3% Epoleon concentrate against the total volume of recyclable water is suggested. If you choose to use both formulas simultaneously, add each one into the system separately, one after the other. Add as much of one formula and as little of the other as you deem appropriate. For odors resulting from higher levels of neutral gases, use a higher portion of N-7C. For higher levels of acidic or alkaline gases, use more N-100. More fragrant results call for more N-7C. Note, N-7C contains emulsifying agents so some foaming may occur. Most situations call for anywhere from 100% N-7C to a half and half mixture of N-100 and N-7C formulas to be used. It is generally best if the amount of recyclable water in your scrubber is at a 1:400 to 1:500 CF3 ratio with the level of exhaust gas. The addition of Epoleon, in any case, will maximize deodorization results as well as extend your water's change time.

Where & How: Epoleon should be added directly into the recyclable water holding tank at the start of the water's cycle. The 01%-3% Epoleon concentrate can be added all at once or in smaller, daily increments between water changes. Epoleon can also be used as a supplement to inorganic chemicals including caustic soda or sodium hypochlorite in order to further deodorization.



WASTEWATER TREATMENT

Formula: N-100 and /or N-7C

Dosage Rate: Anywhere from .01 to 10ppm of Epoleon concentrate against the total volume of wastewater per day is suggested. Epoleon's dosage rate may change with fluctuating gas levels. Any combination of the two formulas can be used or each formula can be used alone. For wastewater containing high levels of neutral gases, use a higher percentage of N-7C. For high levels of acidic or alkaline gases, use a higher percentage of N-100. For topical applications, Epoleon can be diluted 50 to 100 times and sprayed over the surface of wastewater for an immediate but temporary remedy.

Where & How: To maintain optimal conditions, Epoleon should be applied daily or regularly either by using an automatic drip system or by manually pouring Epoleon into the wastewater entrance area where there is the most turbulence. Consistent use of Epoleon will prevent the production of new gases as well as combat aging gases so, considerably less and less Epoleon concentrate will be required to maintain optimal conditions over time.



SLUDGE TREATMENT



Formula: N-7C or N-11

Dosage Rate: Epoleon formulas can be sprayed at full concentration or diluted several hundred times.

Where&How: Epoleon can be sprayed directly into digester tanks, over the surface of sludge as it's transported to drying beds, or during dehydration. Manual spraying of a diluted Epoleon solution is effective but for best results, we recommend using an automatic fogger or misting system, one which would regulate frequency and dilution rates. Using a higher level of Epoleon concentrate in an atomizer or fogging system will yield quicker results with less moisture. For indoor applications, Epoleon can be used at full concentration with less frequency than outdoor applications. Epoleon can also be used during sludge transportation. Dilute and spray Epoleon over the sludge after it has been loaded onto trucks to control odors during travel. Once the truck has been unloaded, a diluted Epoleon solution can be used to rinse the bed of the truck to remove any residual sludge odors.

LANDFILL APPLICATIONS

Formula: N-7C or N-11

Dosage Rate: Epoleon formulas can be sprayed at full concentration or diluted several hundred times.

Where & How: A diluted Epoleon solution can be incorporated into a perimeter fogging system or manually sprayed over the surface of the landfill. Epoleon should be applied regularly in order to effectively reduce odors and prevent ensuing complaints from neighbors. An exact agenda is ultimately left for the end-user to determine, based on the strength of odors, how frequently the landfill is added to and weather conditions such as wind direction and temperature. A diluted Epoleon solution can also be used at transfer stations or to wash transportation vehicles.



PRODUCT SPECIFICATIONS

N-100 Compounds and Physical Properties

Organic and Salt of Organic Acids
 Amine Compounds
 Betaine Compounds
 Water
 pH.....5.0 - 6.7 (at 25°C)
 Boiling Point100°C
 Freezing Point0°C
 Vap. PressSame as Water
 Solubility in WaterCompletely
 Sp. Gravity1.17 ± 0.05(At 25°C)
 Range of Molecular Weight50 - 800
 AppearanceTransparent Sl. Yellow
 OdorNone

N-7C Compounds and Physical Properties

Glycine Betaine
 Organic and Salt of Organic Acids
 Amine Compounds
 Essential Oils
 Water
 pH5.2 - 6.7(at 25°C)
 Boiling Point100°C
 Freezing Point0°C
 Vap. PressSame as Water
 Solubility in WaterCompletely
 Sp. Gravity1.06 ± 0.05(At 25°C)
 Range of Molecular Weight50 - 800
 AppearanceTransparent Sl. Yellow
 OdorFloral Scent

Theoretical Rate for Deodorization Effect on Each Type of Epoleon

Deodorizing effect by 1 gram of each type of Epoleon is as follows: (Units below are measured in mg.)

| Type of Epoleon | Ammonia NH ₃ | Hydrogen Sulfide H ₂ S | Trimethylamine (CH ₃) ₃ N | Methyl Mercaptan CH ₃ SH |
|-----------------|-------------------------|-----------------------------------|--|-------------------------------------|
| N-100 | 24.1 | 42.7 | 83.7 | 21.6 |
| N-7C | 6.1 | 20.1 | 21.2 | 2.6 |
| NnZ | 11.9 | 14.3 | 41.3 | 5.5 |

Head Space Deodorization Test Procedure

One milliliter of deodorizer and 19ml of solution which includes odorous gas and water (total 20ml) is mixed then added into a 500ml Erlenmeyer flask. The flask is shut with the rubber stopper and stirred for 10 minutes. Then the concentration of odorous gas (in the head space of the upper portion of the flask) is measured by a gas analyzer.

As a comparison, the same test procedure was done with only water and competitive products and water.

By the simple Head Space Method of testing, it is easy to see Epoleon's effectiveness on reducing and eliminating ammonia and various other gases.

Test Specifications

| | |
|---------------------------------|--------------|
| Erlenmeyer Flask: | 500ml |
| Time Period Before Measurement: | 10 min. |
| Measurement Device: | Gas Analyzer |
| Amount Deodorizer: | 1ml |
| Amount of Solution: | 19ml |
| Temperature: | 25°C |

Rate of Elimination for N-100

| | Original Content | After Adding Epoleon |
|------------------|------------------|----------------------|
| Ammonia | 700ppm | 20ppm |
| Hydrogen sulfide | 3000ppm | 40ppm |
| Methyl Mercaptan | 10ppm | <1ppm |
| Trimethylamine | 120ppm | trace |

Rate of Elimination for N-7C

| | Original Content | After Adding Epoleon |
|------------------|------------------|----------------------|
| Ammonia | 700ppm | 100ppm |
| Hydrogen Sulfide | 3000ppm | 120ppm |
| Methyl Mercaptan | 10ppm | 3ppm |
| Trimethylamine | 120ppm | 5ppm |



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