EverGreen
Chemical Solutions

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Evergreen 12
Degassing/Hydrocarbon Removal/Remediation Chemistry

Contents

PHYSICAL PROPERTIES

Product Name	Evergreen 12
Physical Form	Clear Liquid
Color	Colorless unless dyed
Specific Gravity (Water = 1)	1.028 +/- .10
Solubility in Water	100%
Density	1.0053 <0.1+/-
API	9.11 +/-.10
Freezing/Melting Point	NE
Flash Point (^{0}F)	>200^0 F
pH	8.5 +/- .25
Reportable Quantity (RQ)	None

Complete information on health hazards, protective equipment, handling precautions, environmental hazards and disposal is listed in the current Evergreen 12 Safety Data Sheet (SDS) for this product.

SUMMARY

Evergreen 12 is a non-flammable, non-toxic, water-based, proprietary blend of non-ionic ethoxylated octylphenolic surfactants that has been specifically engineered as a cleanup/mitigation agent for a wide range of hydrocarbon products. Evergreen 12 has been shown to be effective for quickly and effectively suppressing or eliminating VOCs, LEL's, benzene and low levels of H_2S and mercaptans in open or confined spaces.

Evergreen 12 has been used for cleanup of hydrocarbon spills and soil remediation. In these applications, Evergreen 12 effectively conditions (physically) the hydrocarbon such that the microbes that naturally occur can more readily consume it. It turns hydrocarbons into a nutrient source for the microbes. When sufficiently mixed with hydrocarbon and water, the Evergreen 12 forms a homogeneous solution of hydrocarbon, Evergreen 12 and water, which is very stable.

Evergreen 12 is a concentrated product that readily biodegrades.

Evergreen 12 is commercially available in 5gallon units, 55-gallon drums, and 330-gallon totes and bulk from Houston, Texas.

FLUID DESIGN

Evergreen 12 is a proprietary blend of surfactants that needs to be diluted to be effective, and it is very safe to workers and the environment. Evergreen 12 does **not** contain caustic, therefore does not have the common harmful side effects associated with caustic based products. The product is designed for use as a degassing agent and a cleaner/degreaser for remediation. The product does not contain any enzymes or biomass itself. It works by conditioning the hydrocarbon so that the naturally occurring microbes (bacteria) can readily consume it. Through the application of the appropriate dilution and mixing, the Evergreen 12 will capture the hydrocarbon and tie it up in a solution that is very stable. The formation of this solution results in extremely small particles that will not recoalesce. It is important to note that if Evergreen 12 reaches its saturation point the oversaturated hydrocarbon will breakout of solution very quickly. This will allow for easy removal or reclamation of any hydrocarbon that is not preconditioned for remediation.

In addition to tying up the hydrocarbon in solution, the product is very effective when contacted with hydrocarbon vapors at suppressing volatile organic vapors, gases, and odors. Once combustible and flammable hydrocarbon vapors are tied up in the resultant solution, the solution will be very difficult to ignite. It also accelerates the biodegradation process of the hydrocarbon, thereby enhancing recycling or reclamation of water.

Evergreen 12 has been demonstrated to be effective on gas, oil, lube oil, hydraulic oil, most petroleum-based products, animal and vegetable oils, fats, and tallow oils. Evergreen 12 cleans the heavy tar build-up, asphaltenes or oily residue from inside of tanks and vessels. Furthermore, once a surface has been cleaned with Evergreen 12, the cleaned surface will resist the deposition of oily materials.

Evergreen 12 can be used to cleanup oil spills whether in/on soil or hard surfaces. The first step in this process is to remove as much of the free oil as possible. This step is followed by contacting the contaminated surface appropriately with the proper dilution of Evergreen 12 and water. The treatment solution will contact the hydrocarbon molecules and change their behavior such that they are now essentially water soluble. The large increase in interfacial surface area creates conditions that are favorable to degradation and consumption by bacteria and microbes. The product converts hydrocarbons into a very good nutrient source for bacteria and microbes.

Evergreen 12 is typically fed at a concentration of 10%, depending on the nature of the hydrocarbon contamination problem. It can be diluted with most types of water – hard, soft or brackish water. The product has an unlimited shelf life when unopened. Evergreen 12 is effective at ambient temperatures. However, the **effectiveness will increase as the temperature of the application is increased**. Evergreen 12 does not require the use of steam but has been shown to be very effective when injected into the steam (vapor) phase.

FIELD MIXING PROCEDURES

Mixing Concentrates

Evergreen 12 is usually delivered as a concentrate and **must** be diluted with water to work properly. Cleaning solutions can be formulated by premixing or eduction. It is not necessary to provide high shear agitation when preparing a batch of cleaning solution since Evergreen 12 is 100% soluble in water. It is recommended that when preparing the cleaning solution, you first add the water into the mix container and then follow by the addition of Evergreen 12. This will minimize foaming as the Evergreen 12 and water form a homogeneous solution.

For premixing, the following procedure may be used:

1. Add the correct amount of water to the container.
2. Depending on the desired strength, add the correct amount of Evergreen 12 to the container.
3. If the final solution is not a consistent pink color, mild agitation may be required until a consistent pink color is achieved.

Quality Control Testing

There is no easy field-testing procedure to monitor the concentration of active ingredients in the Evergreen 12 formulation. Visually the color changes from rose color to lighter pink as the product is further diluted. Effectiveness can also be predicted by quantifying the amount of hydrocarbon that is to be picked up. By observing the effluent from the use of Evergreen 12, an adjustment in the cleaning solution concentration can be made. If it is observed that free oil is floating on the effluent solution, then the concentration should be increased.

MATERIAL REQUIREMENTS

For specific protocols and application rates, please refer to the product label or consult with the manufacturer or authorized distributor for additional guidance.

Equipment Cleaning & Parts Washing

Evergreen 12 is very effective for equipment cleaning applications. Evergreen 12 is used at light dilutions and has a significant “life of batch” as well as low foaming tendencies. The surfactants in Evergreen 12 desorb and micro emulsify grease and oil contamination and separate it from solids (metal shavings, grit, etc.) allowing them to settle without accumulating oily sludges. These factors make Evergreen 12 ideal for spray wash systems as well as dip/agitating equipment. Some agitation or circulation of the fluid is required for thorough cleaning. For equipment cleaning applications, Evergreen 12 is normally diluted to a 10% solution with water.

Soil Remediation

Calculate the volume of hydrocarbon contained in the contaminated area. It is important to determine accurately the depth of oil penetration into the soil. It will be important to agitate the soil to just below the depth of penetration. Once the estimate of hydrocarbon is known, the amount of the normal dilution of Evergreen 12 for soil remediation is 10 parts waters to 1 part Evergreen 12 (10% solution). Mix the final solution to be used to treat the area into the soil thoroughly. Depending on the nature of the soil, this mixture should be mixed until consistent. This mixing can be accomplished using a metal rake or power rototiller. However, larger jobs may require a tractor, skid steer with tiller attachment, or other equipment.

Once mixed, the naturally occurring bacteria in the soil will begin to consume the hydrocarbon, which has been put into a form that can be quickly consumed. The remediation process normally occurs over 4 to 12 weeks.

Samples can be taken and analyzed for Total Petroleum Hydrocarbons (TPH) to track the progress of the remediation. If the TPH were to appear to stabilize and not continue to decline, a second application of Evergreen 12 may be required.

***Note*:** It can be helpful, but not required, to add a highly soluble, high nitrogen fertilizer such as Miracle Grow or Sam’s Choice to the first treatment of the Evergreen 12 solution.

The addition of bacteria is not typically required. The Evergreen 12 solution will stimulate the activity level of the naturally occurring bacteria.

In the fall and winter, it helps to expedite the job if the treatment cell is covered with plastic between treatments. This tends to hold in heat and generate additional moisture.

Keeping the soil moist is an integral part of the clean-up.

Emergency Response & Spill Cleanup

Small Spill Cleanup: Dilute Evergreen 12 to a 10% solution. On small spills apply with 2 ½ gallon pressure sprayer or similar device. Cover the entire spill working in a circular motion from outside perimeter toward the center of the spill. After application of Evergreen 12 has been completed, agitate spill area with forcible stream of water or broom and rinse thoroughly. Evergreen 12 helps to reduce or eliminate any VOC concerns associated with the cleanup by micro-emulsifying the hydrocarbon on contact drastically reducing the LEL levels in a very short time frame. Evergreen 12 also eliminates sheens.

On Roadways & Pavement: Evergreen 12 can be applied with a pressure sprayer or applied through a foam eductor.
Evergreen 12 will instantly stop the deterioration of asphalt by diesel or gas and eliminate slippery conditions. Dispose in accordance with local rules and regulations.

***Note*:** For use with absorbents, Evergreen 12 will increase effectiveness by allowing the contaminate to more easily penetrate the absorbent.

Degassing & Cleaning of Tanks & Equipment

Evergreen 12 is effective for the degassing and cleaning of all types of petroleum storage tanks. For small tanks of less than 50,000 gallons, Evergreen 12 should be utilized through a power washer normally at a dilution of 10% depending on the type of product within the vessel and the degree of contamination. Typically for flammables, a more concentrated solution is utilized to completely agitate the tank residue and to scour the wall of the vessel prior to and during pump out. Lower dilutions may be utilized for products not representing a vapor hazard. Evergreen 12 is also effective for reducing H2S, Benzene and other VOC's.

Tank Bed Remediation

A common and effective means of mitigating the vapor hazard and remediating the tank bedding is to utilize a "flushing and recovery" technique with a diluted solution of Evergreen 12. Typically, a 10% solution of Evergreen 12 and water is utilized in a batch process to treat the impacted portions of the tank floor area. Simply perforating the affected area with a "buster" or hole saw and allowing the Evergreen 12 solution to flood the affected bedding will eliminate immediate, and future, recurrences of vapor generation. The process also serves to remediate the contamination by flushing entrained hydrocarbon out of the bedding for recovery and disposal, or re-processing. If necessary, the entire sub-floor area may be treated by saturating the zone of contamination and flushing the fluid to the sump, or other collection point, and recovering the rinsate for disposal. Depending upon the severity of the leak, and the resultant degree of subfloor contamination, the Evergreen 12 solution can be applied to simply saturate the bedding material, or it can be injected to flush and recover gross quantities of hydrocarbon.

Chemical Pipeline Pigging

As a general guideline, pump a slug of 10% solution and chase with water.

VOC Vapor Mitigation & Odor Control

Evergreen 12 is typically applied at a concentration of 10% for vapor and/or odor control. Circulate the solution through a manway cannon or other device to provide sufficient saturation of the vapor space of the vessel that is being degassed. Check the vapor level of the tank before circulation begins. Circulate for about 2 hours and let the tank settle for another 2 hours. Check the vapor level in the tank. More than one circulation may be required for complete vapor suppression. The holding capacity of Evergreen 12 may require sweetening or circulation with a fresh batch of product, depending on the amount of hydrocarbon vapors originally contained in the vessel.
Dilute Evergreen 12 to a 10% solution. Coverage is normally at 3 to 4 square yards of surface area per gallon. Heavy contamination or mercaptan type odors may require a stronger solution of Evergreen 12.

Typically, 1 gallon of Evergreen 12 concentrate diluted to a 10% solution will render up to 6 gallons of petroleum product nonflammable when properly applied.

Hard Surface Cleaning & Decontamination

For heavy soiled oil and grease on hard surfaces: Mix a 10% solution of concentrate with clean water in quantity sufficient to cover contaminated area. Apply generous amounts with spray applicator, or equivalent and allow reasonable time for the surfactants in Evergreen 12 to penetrate and break down the hydrocarbon and grime. Once applied, solution may be scrubbed or brushed in for stubborn soiling. Next, apply Evergreen 12 at a 3% solution through a power washer (heated power wash system will expedite the process). Flush residue to containment and dispose of as local rules apply.

For lightly soiled or freshly oiled surfaces: Evergreen 12 may be used through any power washer or steam jenny currently available. Operating temperatures of 140 degrees F. will maximize effectiveness. Solution strengths of 10% should be used for decontamination duties. For small applications, Evergreen 12 may be applied with a small pump sprayer and scrubbed or brushed into surface.

Surface Washing & Shoreline Cleanup

Dilute Evergreen 12 to a 10% solution. On small spills, apply with pump sprayer or similar device. Cover entire spill, working in a circular motion, from outside perimeter toward the center of the spill. After application of Evergreen 12 has been completed, agitate spill area with forcible stream of water or broom and rinse thoroughly.

On larger spills, specific applications and protocols should be developed considering local risks and considerations.

Fire Fighting for Class A & B Fires

Proportioning Rate:	10%
GPM Flow Rate:	95 – 110
PSI at Eductor:	200 or MFG's recommendations
Hose Length:	As per MFG's suggestion
Nozzle Type:	Standard adjustable or automatic
Coverage:	0.2 gpm per square foot
Nozzle Pattern:	Hard cone to coarse stream
Application:	Starting from the outside perimeter, using a stirring, mixing action.

Contaminated Soil Excavation

In most cases a 10% solution of Evergreen 12 will be adequate to keep vapor emissions within acceptable limits. The Evergreen 12 solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well. Generally, 1 gallon of solution will cover approximately 4 sq. yd. of soil surface area.