SuperAll #38

Hydrocarbon - Cleaning / Removal / Degassing / Remediation Chemistry

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PHYSICAL PROPERTIES AND HAZARDS

Product Name:	SuperAll #38
Form:	Rose Color - Liquid
Specific Gravity:	1.056
Freeze Point [^{0}F(^{0}C)]:	32(0)
Health Hazard:*	Eyes
Physical Hazard:	None
Flash Point [^{0}F(^{0}C)] :	>250(>121)
pH:	≤ 12.3
Reportable Quantity (RQ):	None

* Only the principal, immediate hazard is indicated here. Complete information on health hazards, protective equipment, handling precautions, environmental hazards and disposal is listed in the current SuperAll #38 Safety Data Sheet (SDS) for this product.

1 SUMMARY

SuperAll #38 is a non-flammable, non-toxic, water-based, readily-biodegradable blend of nonionic and cationic surfactants that is buffered at an alkaline pH and designed to work at ambient temperatures on light ends and low to medium resides. It is not as effective on paraffins or asphaltenes at ambient temperatures, but has shown to be effective on both when applied at elevated temperature and appropriate energy levels. SuperAll #38 is extremely efficient at quickly and effectively suppressing or eliminating VOCs, LEL's, benzene, H_2S and mercaptans in open or confined spaces, soil, excavations and when used in vapor control scrubbers.

SuperAll #38 is used for the cleanup of hydrocarbon spills and soil remediation. In these applications, SuperAll #38 conditions (physically) the hydrocarbon such that the microbes that naturally occur in the environment can more readily consume it. It turns hydrocarbons into a nutrient source for the microbes. When sufficiently mixed with hydrocarbon and water, the SuperAll #38 forms a homogeneous solution of hydrocarbon, SuperAll #38 and water, which is very stable.

SuperAll #38 is a concentrated product and since it readily biodegrades, it is easily processed through wastewater treatment plants.

SuperAll #38 is commonly used in tanks, production units, pumps, pads, piping/pipelines, wash racks, wastewater, soil remediation, underground remediation, degassing: soil excavations, open & confined spaces, liquid vapor scrubbers, solids washing, sludge motivation and anywhere hydrocarbon mitigation is required

SuperAll #38 is commercially available in drums, totes and bulk from Mandeville, LA and drums and totes from Tomball, TX.

2 FLUID DESIGN

SuperAll #38 is a proprietary blend of surfactants that is very safe for workers and the environment. SuperAll #38 is an alkaline pH product but does **not** contain caustic (sodium hydroxide), therefore does not have the common harmful side effects associated with caustic based products. The product is designed for use as a degassing agent, a cleaner/degreaser and for hydrocarbon remediation. The product does not contain any microbes, enzymes or biomass itself. It works by conditioning the hydrocarbon so that the naturally occurring microbes (bacteria) are able to readily consume it. Through the application of the appropriate dilution and mixing, the SuperAll #38 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 SuperAll #38 reaches its saturation point the oversaturated hydrocarbon will break out 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 resulting 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.

SuperAll #38 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. SuperAll #38 cleans the heavy tar build-up, asphaltenes or oily residue from inside of tanks, vessels and other any other contaminated equipment. Furthermore, once a surface has been cleaned with SuperAll #38, the cleaned surface will resist recontamination of oily materials.

SuperAll #38 is extremely efficient at washing hydrocarbons from solids. Tank bottoms, catalyst etc. can be washed and processed to result in clean solids reducing disposal volumes and decreasing cost of disposal.

SuperAll #38 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 (typically ~10%) of SuperAll #38 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.

SuperAll #38 must be diluted with water to be effective. Typical applications require between a 1% and 15% solution, depending on the nature of the hydrocarbon contamination problem. It can be diluted with most types of water – hard, soft or salt water. The product has an unlimited shelf life. SuperAll #38 is effective at ambient temperatures. However, the **effectiveness will increase as the temperature of the application is increased**. For example, the optimum temperature for removing weathered crude oil deposits is >150 ^{o}F. SuperAll #38 does not require the use of steam, but has been shown to be very effective when injected into the steam (vapor) phase.

3 FIELD MIXING PROCEDURES

3.1 Mixing Concentrates

SuperAll #38 is 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 SuperAll #38 readily disperses into water.

For premixing, the following procedure may be used:

1. Depending on the desired strength, add the correct amount of SuperAll #38 to the container.
2. Add the correct amount of water 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 SuperAll #38 formulation. As the product is diluted the pH will decline, as shown in Table 2. Keep in mind that final pH value will also be dependent on the pH of the dilution water. 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 SuperAll #38, 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.

4 MATERIAL REQUIREMENTS

One rule of thumb for determining the amount of SuperAll #38 is 1 gallon of the concentrated product is needed for every 5 gallons of hydrocarbon.

Table 1 shows typical dilution rates for most SuperAll #38 applications. The correct dilution rates are also listed below the application headings of sections 4.2 through 4.6

4.1 Dilution & pH Tables

TABLE 1 HYDROCARBON DILUTION RATES FOR SuperAll #38	
Fuel, light oils	2%
Heavy Crudes/Oils	2 - 3%
Grease	5%
Paraffin	5%*

* When using SuperAll #38 for paraffin cleaning typically the use of 140 ^{0}F or greater water will be required.

TABLE 2 pH vs. WATER DILUTION FOR SuperAll #38	
Dilution	**pH**
Pure	**12.4**
5:1	**12**
8:1	**11.8**
11:1	**11.5**
15:1	**11**
20:1	**10**
30:1	**9.5**
40:1	**9**

4.2 Degassing: Vapor Suppression/Odor Control (VOC & H2S)

Required Solution: 2% to 5% (50:1 to 20:1)

SuperAll #38 is typically applied at a solution of 2-5% for VOC & H2S vapor and/or odor control. For enclosed or confined spaces such as tanks or vessels, circulate the solution through a manway cannon or other device in order to provide sufficient saturation of the vapor space of the tank/vessel that is being degassed. Check the vapor/VOC level of the tank/vessel before circulation begins. Circulate for about 2 hours and then let settle for about 2 hours. Check the vapor/VOC level in the tank/vessel. More than one circulation may be required for complete vapor suppression, but always allow 2 hours settling time after circulation is stopped before checking vapor/VOC levels. The holding capacity of SuperAll #38 may require sweetening or circulation with a fresh batch of product, depending on the amount of hydrocarbon vapors originally contained in the vessel.

For open areas such as excavations or tanks with compromised roofing SuperAll can simply be applied by misting the open space where vapors would escape. This can be done with a pressure washer for small areas, or with a fire nozzle for larger openings. Vapor/VOC readings should drop immediately.

4.3 General Hydrocarbon Cleaning

Required Solution: 2% to 5% (50:1 to 20:1)

Dilute SuperAll #38 with water as required for the type of hydrocarbon to be cleaned, between 2%-5% solution directly into the day tank of a pressure washer. Apply SuperAll #38 at high pressure directly to the surface to be cleaned through a fan tip with slow sweeping motions. **(Do not use a moving or "turbo" nozzle with SuperAll)** The motion should resemble painting in reverse, where instead of applying paint you are removing hydrocarbon. It is **not** recommended to pre-spray SuperAll #38 and allow it to "soak" directly on a surface that is to be cleaned, as SuperAll #38 is **much** less effective when applied this way. Heat is not always required for SuperAll #38 to be effective; however the **effectiveness will increase as the temperature of the application is increased**. SuperAll #38 is typically applied between 2500 – 3000 psi but can be used in hydroblasting operations such as cleaning heat exchanger bundles.

4.4 Soil Remediation

Required Solution: 12.5% (8:1)

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 SuperAll #38 required to remediate the oil can be estimated based on – 1 gallon of SuperAll #38 is to be used for every 5 gallons of hydrocarbon contamination. The normal dilution of SuperAll #38 for soil remediation is 8 parts water to 1 part SuperAll #38 (a 12.5% solution). Mix the final solution to be used to treat the area into the soil thoroughly. The consistency of the soil/solution mixture should be that of a milkshake. 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 tiller. However, larger jobs may require backhoe type equipment.

Once mixed the naturally occurring microbes in the soil will begin to consume the hydrocarbon, which has been put into a form that can be quickly consumed. The remediation process will occur over several weeks or months.

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 subsequent application of SuperAll #38 may be required.

4.5 Spill Cleanup

Required Solution: 5% to 12.5% (20:1 to 8:1)

A 5% - 12.5% solution of SuperAll #38 should be used to wash down the entire spill area. This solution can be applied using a 2500 to 3000 psi pressure washer. If the spill occurs on soil it is not necessary to disturb the soil as long as the spill cleanup efforts start before the hydrocarbon has had a chance to migrate into the soil. If spill cleanup efforts are delayed and the hydrocarbon migrates into the soil, follow the instructions for "soil remediation" to remediate the impacted soil. The effluent from this process can be collected and treated through a waste plant or allowed to drain onto soil where the naturally occurring microbes will consume the hydrocarbon.

4.6 Solids Washing / Sludge Motivation

Testing Required

To find the appropriate concentration to dilute SuperAll #38 for washing solids free from hydrocarbon, the solids will require lab testing. Contact SuperAll Environmental 281.351.4800 to have solids tested or obtain testing protocol. Once the necessary concentration and temperature has been determined, apply solution at temperature to the oily solids with agitation such as an agitated frac tank. Once agitated dry the solids with a mechanical device such as a shaker or centrifuge.

Sludge Motivation will require Lab testing just as above. Once the necessary concentration and temperature has been determined apply solution at temperature to the sludge through typical means such as a manway cannon, sweep nozzles or recirculation pumps. Agitate the sludge until it is in a solution and can be pumped to the required destination.