Paratene® Products for Tank Cleaning and Degassing

Clean Harbors Chemicals group provides a number of products that can be used alone or in combination to clean and degas hydrocarbon storage tanks.

The selection of which products and in what order is dependent on the scope of the project and the desired outcome.

The process of tank cleaning can be divided in to several parts:

Sludge recovery and separation

Sludge recovery and separation is performed where significant volumes of product residue remain in the tank and analysis shows the potential for recovering at least some of the value. A diluent is added along with the appropriate chemical dispersant and the tank is mixed using high sheer mixing systems.

In some cases the sludge can then be left to separate into layers of recoverable hydrocarbon, solids and water or may need additional treatment such as mechanical separation by centrifugation may be required.

Chemical Selection

The choice of which Paratene® product to use depends on the composition of the sludge, the available types of diluents, and the requirement to heat the mixture. Some examples are given below:

Sludge	Diluent	Recommended Products
Waxy sludge	Waxy crude oil	Paratene® S-620
Waxy Sludge	VMP Naphtha	Paratene® S-620
Waxy sludge	Varsol	Paratene® S-620
Waxy sludge with asphaltenes	Condensate	Don't do this EVER
Waxy sludge with asphaltenes	Diesel Fuel	Paratene® S-620, Paratene® S-627
Waxy Sludge with high asphaltenes	Diesel fuel	Paratene® S-627, Paratene® S-620
Asphaltic sludge	Diesel Fuel	Paratene® S-627
Asphaltic sludge	Crude oil and Xylene	Paratene® S-620

Paratene® S620	Paratene® **S620 is a blend of surfactants designed to disperse waxes in hydrocarbon solutions. The surfactants interact with the wax crystals acting to disperse them without having adding high amounts of sheer or heat.**
Paratene® S627	**Paratene® S627 is a surfactant that disperses asphaltenes and lowers the effective viscosity of heavy oil. S627 also aids in breaking asphaltene stabilized emulsions.**

The process has been used extensively since 1999 with most recent excellent results being seen at Ultramar's Quebec refinery and several tanks at Safety Kleen's Lambton facility.

Removal of Residues

In some cases the amount of material remaining in a tank is too small or uneconomic to recover. The desire is to simply remove the residual hydrocarbons and render the tank clean for entry. The chemical selection in this case depends on the size of the tank and available resources as well as desired result.

Using Steam or REALLY hot water

Clean Harbors has two related products for use in Steam or high temperature degassing and cleaning.

Paratene® D740	**Blend of surfactants to remove light to medium hydrocarbons. Encapsulate some volatile hydrocarbons and neutralize hydrogen sulfide gas. D740 works best in systems that can be vented to flare as the higher temperatures of steam will tend to vaporize the more volatile light ends of deposits. Typically applied at a rate of 2% by weight in steam.**
Paratene® D742	**Blend of surfactants and solvents designed to remove heavy hydrocarbons and water wet solids leaving interior surfaces clean and hydrocarbon free. D742 works best in systems that can be vented to flare as the higher temperatures of steam will tend to vaporize the more volatile light ends of deposits. Typically applied at a rate of 2% by weight in steam.**

Paratene® D740 and D742 have been applied in cleaning towers, vessels and tanks at Suncor Firebag, and CNCP, Tianjin Dagang Refinery and Chem China, Shandong Changyi Petrochemical

COLD water

Clean Harbors has designed a pair of water based degreasing products that work well in warm to cold water to remove hydrocarbons and encapsulate hydrocarbon vapour to allow rapid entry of hydrocarbon storage tanks.

Paratene® D734OC	**Paratene® D734OC is specifically designed to degrease surfaces while simultaneously controlling hydrocarbon vapor. It has special additives to react with H2S and mercaptans to reduce odors and is designed to work in COLD or cool water. No flares or vents are required. Applied at between 5 and 10% in cold water.**
Paratene® D707	**Paratene® D707 is a phosphate free biodegradable microemulsion degreaser designed to remove hydrocarbons and encapsulate them reducing vapour emissions. Paratene® D707 works both temperatures ranging from 10 – 90°C and is effective at dilutions of 5 – 10% in water.**

D707 and D734OC have been applied extensively in cleaning systems at place such as Suncor Firebag, Tesoro, Husky oil, Shell Canada, and Cenovus.

Just H2S

Sometimes all the system needs is for the amount of hydrogen sulfide to be reduced to zero to make the unit easier to clean.

Paratene® M310	**Water based triazine type hydrogen sulfide scavenger.** Paratene® **M310 can be added at rate to 3:1 to 5:1 of scavenger to H2S in the liquid phase and will rapidly reduce the total H2S content of a system to zero.** Paratene® **M310 contains NO free formaldehyde.**
Paratene® M311	**Solvent based triazine type scavenger. M311 can be added to primarily hydrocarbon systems to remove hydrogen sulfide. Applications rate of 3:1 to 5:1 based on the content of H2S in the oil are required.**
Paratene® **M320**	**Paratene M320 is a water based scrubbing solution designed to remove hydrogen sulfide from vapor emissions. Paratene® M320 can be combined with Paratene D707 to create a scrubbing solution that will remove H2S, mercaptans and BETX from vapor emissions.**

The numbers of locations these products have been used at include Imperial Oil, Shell Canada, Husky oil, Cenovus, CNRL, Dow Chemical, Nova chemical, DuPont, and many many others.