

Guide to Rotary Impingement Cleaning



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In the ever increasing push to find new ways to power vehicles, the next generation of fuels have made their way to the market. While this is not news, the need to ensure a safe and reliable storage of these products prior to fill up, probably is. Newer fuels, while solving some environmental issues, have created the need for more frequent cleaning of their storage tanks. If left unchecked, a long list of issues can arise; including, frequent filter changes at the dispenser and the resulting longer fill times for the consumer, bacterial contamination and phase separation from the presence of water.

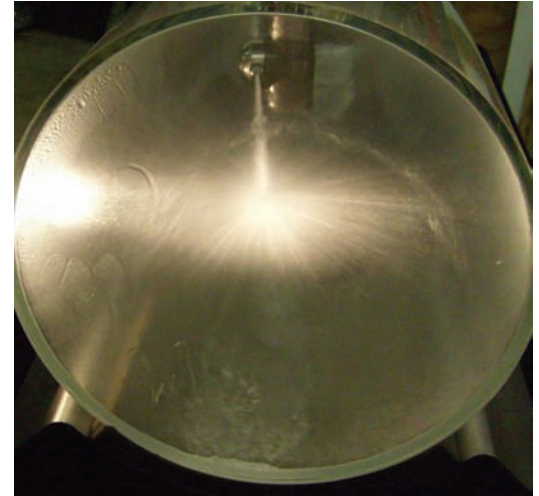
Over time, several techniques have been developed to address the issue of cleaning the storage tank or the product. These include the suck out, bottom snake, fuel polishing, the dreaded cut and enter, and rotary impingement cleaning.

The suck out is performed using a DOT approved vacuum truck and, as the name implies, draws most of the product out of the vessel. The hope is some of the contamination and sludge will be removed. The tank is then refilled with fresh product and, in some cases, an algacide is added.

A second approach is to insert a flexible hose into one end of the vessel and force it to snake across the bottom. As it moves, a suction pump draws any sludge, water or product it encounters out of the tank and through a simple filter. Everything that makes it through the filter is drummed for disposal, including both undesirable components and good product.

Fuel polishing, a third alternative, is similar to the bottom snake, but offers the benefit of returning the good product to the tank. In this approach, the fuel is drawn out of the tank with either a snake or rigid stinger. It passes through two or more different mesh filters and a water separator. A fuel-conditioning magnet may be employed along with an algacide injector. The cleaned and filtered product is then returned to the tank through another opening.

The last resort is the cut and enter. When all else fails, men enter the tank with pressure washers. If the vessel is a UST, the pad must be cut, a portion of the cover must be removed prior to reaching the vessel, then, the tank is cut open for entry.



An inside look at the 360 cleaning power of the Gamajet X.

With the exception of the cut and enter, these techniques all have a common drawback; the entire tank is never cleaned. Only a small portion of the bottom is addressed while the upper 90% is never touched. Good product is introduced into a dirty vessel and, shortly thereafter, contaminated. The cut and enter, while ensuring the vessel is clean, comes with its own drawbacks including the high cost of tank down time and hazardous confined space entry. The final option, rotary impingement cleaning, addresses all of these issues.

Originally developed to clean ocean going petroleum tankers, the rotary impingement cleaner for years has been the preferred method of cleaning tanks in the brewing, food and beverage, pharmaceutical, paint and numerous other industries. Now, it has come back to its petroleum roots and is being used to clean UST's and AST's.

As the name implies, the device is a dynamic head that, as it spins inside the tank, directs jets (two or more) of liquid from its nozzles in a full 360 pattern against the walls of the vessel. Pneumatic electric motors can be used to drive it, but the simplest method is media driven. In other words, the action of the wash liquid passing through it causes it to rotate. Regardless of the drive, the impact of the wash liquid against the vessel's wall causes the dislodging of debris that would otherwise remain in the tank.



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Commonly, the 360 pattern is generated from the rotation of two components, the tee housing (named because of its shape) and nozzle housing. They are connected by a set of bevel gears that differ by one or two teeth in number and, thus, cause the machine to index by a few degrees every rotation. Over the course of a few minutes, a pattern develops which will cover the entire vessel.

The cleaning of petroleum tanks, especially UST's, using rotary impingement cleaners has its challenges. The main one is the combination of a small access size coupled with the overall size of the tank. Obviously the cleaner has to be able to fit into the available opening, a four-inch riser pipe in the case of a UST. This dictates the device be relatively small in size and, more importantly, have nozzles that are short in length. This competes with the need to clean a relatively large vessel, 10' to 12' in diameter by over 30' long. To achieve this, a cohesive jet of liquid must maintain its integrity over a long distance; something which is usually accomplished by employing longer nozzles. A recent breakthrough by Gamajet Cleaning Systems, a leading manufacturer in the rotary impingement industry, has solved this problem with the advent of short nozzles, which offer the same jet performance as ones more than three times their length.

A rotary impingement cleaner can be used to clean AST's and UST's in several different ways depending on the end user's preferences. First, it can be used as a supplement to the fuel polishing method. When the cleaned product is returned to the vessel by the circulation pump, it can be directed through a cleaning head. This will cause the removal of debris from all surfaces of the tank, including the top, and additional agitation of the pool of product at the bottom. The tank must contain a minimal amount of product to

fully realize the impingement benefits of this type of device. Also, if algacide is used, it ensures application of the chemical over the entire internal surface. One must question though, why polish the fuel but not the tank?

In this scenario, the operating pressure is low, typically less than 50 psi with a flow rate of about 25 gpm. This combination prevents the sprayed fuel from atomizing and keeps the pump's motor at a usable amperage for a standard 120v receptacle. Most vessels can be cleaned from a single insertion point. Proper grounding though is imperative!

A second method uses water as the wash liquid coupled with a larger pump, such as one found on a tow-behind trailer. Pressures can be well over 100 psi using about 50 gpm in this setup. Under these conditions even the largest tanks can be cleaned from a single drop point. However, effluent disposal and necessary tank drying are natural side effects of using water. In addition to cleaning tanks that are still in service, when decommissioning or inspecting tanks, this is the method of choice.

A final option uses a slightly smaller cleaner and water. The water is delivered using a large truck-mounted pressure washer. Flow rates start at about 8 gpm and pressures will be in the hundreds of psi. The effluent will be less, but the user sacrifices the convenience of a single insertion point.

Finally, the amount of time it takes to clean a vessel depends on the level of soil, but most petroleum storage tanks can be cleaned in 10 to 15 minutes.

As newer fuels hit the market, a clean UST/AST is a must. The next time you have a filter, water, bacteria or sludge problem, make sure you clean, not only the fuel, but the entire tank, too.



Powerful rotary jets blast away contaminants and break up dirt and sludge on every surface of the tank.

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