Chlorinated Paraffins: Removal

Chlorinated paraffins are excellent stamping lubricants. They protect the tooling during deep draws and allow the formation of the part to take place without weakening the metal. The problem arises when these waxy lubricants need to be removed from the part after they have been formed and before the next process. Moderate pressure spray, a strong alkaline cleaner and high fluid heat is capable of removing the waxy lubricant, but once it is removed it begins to wreck havoc with the part cleaning system itself. There is no cleaning compound available which forces the paraffin to float on the surface and allow for removal via an oil water separation system.

Obviously, volume is important in any metalworking industry. The number of parts processed through the washer determines how often the tank needs to be drained, cleaned and refilled. This plays a significant role in how costly the process is.

Customers must choose from a combination of, in-process methods to remove the paraffin from the washer.

Chlorinated soil drops to the bottom of the tank after a certain level of saturation is reached. This soil accumulates on the bottom of the tank and can cause serious problems for the washer heater elements by coating them with sludge.

Water heating systems, regardless of whether they are electrical, gas, or steam, can be adversely affected by the paraffin sludge. The sludge coats the device, insulating the heat, and preventing the system from warming the water. The stress from this insulation effect causes the devices to eventually fail. Pump inlets, also located at the bottom of the tank, are clogged by the sludge, which prevents the flow of fluids into the tank and stresses the pump motor.

It is critical to avoiding these situations. One method for redirecting the fallout of sludge is to employ a false bottom in the tank. The bottom must stretch the length and width of the tank to be effective. For efficiency, the bottom should not rest on a horizontal level plane. Rather, the bottom can be slanted so that the sludge can be reached before reaching the bottom, and also so that it falls to one side of the tank for easier removal. Gravity, or a system of spray nozzles, can encourage the sludge to fall onto one side of the tank.

Once the sludge has been collected in the tank, it needs to be removed. One-way to accomplish this is through the use of an air diaphragm style trash pump. The pump transports the sludge into a holding tank, where it awaits disposal. The amount of water removed along with the sludge is a drawback to this system, however. The system necessitates careful monitoring to ensure that proper water levels are maintained in the tank. This regular titration will require frequent adding of compound, which undoubtedly will prove to be expensive. The company will be required to analyze the cost of machine downtime opposed to the frequent chemical maintenance and determine which is actually more economically feasible.

As an alternative, a sludge drag out system can be employed. This system is similar to a magnetic chip conveyor in appearance and function. A belt travels along the sludge pit of the tank, squeezing water from the sludge before it leaves the tank. The belt continues to an elevated area outside the tank, where the remaining sludge is scraped off before the belt returns to the tank. There is still a loss of chemistry in the process, but it is less than is lost through the air pump.

Other modifications can be made to extend bath life. One adjustment is to attach a 90-degree elbow and then a pipe extension between the pump and the pump's inlet. This will force the pump to pull from the middle of the bath instead of its normal bottom pull position.

Another possible modification would include adding a "T" into the manifold line and plumbing it down to the bottom of the tank. From there, an elbow fitting is used to add a longer pipe manifold with nozzles that are directed out toward the bottom of the tank and spray while the unit runs. This additional manifold will continue to agitate the sludge so it stays suspended longer in the solution rather than settling onto the components in the bottom of the tank.

The aforementioned alternatives will have to suffice for companies until another option is developed. One option is the development of a compound that forces the paraffin to stay on top of the tank, allowing for the use of a separator to remove the paraffin. Another alternative is to encourage the use of Esters for the production process, instead of paraffin. However, esters are not an ideal solution.

Esters are a sticky residue that acts as a lubricity shield; however, they are not used in a deep draw, extreme pressure application. Esters currently on the market have proven to not be as effective as paraffin when used in the production process. Use of esters requires frequent tooling replacements, as well as resulting in a part with less strength than one formed with paraffin. Until esters are able to compete with paraffin in terms of quality, it is likely that manufacturers will have to look to creative solutions for paraffin removal in order to maximize their profit potential.