



# Cleaning Chemistries for Medical Devices

Cleaning parts with stringent requirements is becoming increasingly difficult. Implementing the right cleaner for the application is critical, especially for an industry such as medical.

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ABOVE: Low-foam qualities in cleaners are critical for some cleaning applications, particularly for washers that run above 20 psi. Foaming can cause major problems, like this overflow on a shop floor. Source | Hubbard-Hall

Evolving cleanliness standards create challenges for surface finishers that perform industrial cleaning, particularly for industries where critical cleanliness is in play, such as for medical devices. Each part order often contains different contaminants, oils and lubricants, creating inconsistencies that can burden the cleaning process and lessen efficiency.

However, understanding available cleaning products and their properties can ease the situation. For instance, a powdered soak cleaner for tumbling acts differently than a concentrated liquid with low foaming qualities. Each chemistry has features and benefits that offer better performance in certain applications.

Tom Mazzamaro, senior account manager at Hubbard-Hall (Waterbury, Connecticut), explains three products offered by the cleaning fluid manufacturer and supplier that have helped surface finishers improve part cleanliness quality and efficiency and lower process costs. He shares a couple of case histories that serve as examples of how these cleaners have enhanced the cleaning process for companies catering to the medical device industry.

## Product #1: Phosphate- and chelator-free powdered alkaline

A part-on-part cleaner used in open-top tumblers and oblique barrels, Hubbard-Hall's Aquaease WP S1 is a powdered alkaline cleaner. It can be implemented as a soak cleaner or an electro cleaner in rack and barrel lines. The surfactant system is biodegradable and is especially useful for ferrous metals, brass alloys, copper, bronze, stainless steel and magnesium alloys (low in aluminum content).

Although chelated agents have their place in some cleaning products to create better cleaning performance, a non-chelated and phosphate-free formulation like WP S1 is more advantageous for a company that uses a wastewater treatment system. Chelating agents are typically discharged from wastewater treatment plants in large quantities and interfere with toxic metal removal, thereby releasing metals into the environment.

To illustrate the problems a chelated cleaner can cause, one company could not stay in compliance with the cleanliness limits for several metals, specifically copper and nickel and zinc, when using this formulation, Mazzamaro explains. Eventually, it replaced its chelated cleaner with WP S1 non-chelated formula to clean its customers' electrode wires on an echocardiogram (EKG) device in 200-pound batches.

"They were spending more money on wastewater chemistry to try to solve the issues," Mazzamaro says. "Sometimes

you can spend thousands of dollars on chemistry, and it's really not getting you to that point where you need to be, so that's why we try to look at the front end [the cleaner being used] to solve the problem."

Not only did switching to the WP S1 cleaner improve wastewater issues, but the surfactants in the product shortened the cleaning cycle. So, instead of this cleaning process taking an hour to an hour and 15 minutes, it was shortened to about 25 minutes. The company cut back on water use and less waste ended up in the wastewater treatment system.

### Product #2: Low-foam spray

Primarily used in helicoil pipe washing machines, spiral spray washers, belt washers or monorail washers, Aquaease SL 917

is a high-alkaline, low-foaming liquid cleaner that is especially useful on steel, stainless steel, nickel, copper and copper alloys. The cleaner is most effective at lower concentrations and temperatures. It also removes light surface rust and scales with its chelating agents.

Parts shaped like long tubes are ideal candidates for this cleaner because of the ability to spray inside the diameter of these shapes to clean off oils and other contaminants left behind from the machining process. One Hubbard-Hall customer uses this low-foam spray cleaner to clean the small stainless steel canisters that are designed for use as asthma inhalers.

The low-foaming characteristic of this cleaner is critical for many applications, especially those that use spray, splash, soak washers that run at about 15 to 20 psi, according to Mazzamaro. "If the psi is higher than that, the cleaner can foam out of the tank, creating a mess on the shop floor," he says

### Product #3: Electrolyte for electropolish

Designed specifically for electropolishing, Hubbard-Hall's ENE Electropolish #1 is an electrolyte formulated to process medical devices made of magnetic and nonmagnetic stainless steels. The strongly acidic chemistry creates an anodic



The Aquaease WP S1 cleaner's phosphate-free characteristic is especially beneficial for those companies with wastewater (an example of the result of plating is seen above). Phosphates, which cause chelation and sludge, are not only difficult to treat but are facing an increasing number of permits/discharge limits. Source | Getty Images

oxide film on the workpiece being electropolished. The anodic oxide film increases the corrosion resistance and passivity of the metal and reduces surface stress and strains. As a necessary component to ensure a clean, uncontaminated surface, the electrolyte prepares parts for secondary processes such as plating or other applications where critically clean surfaces are required.

Although all of these cleaners have been on the market for many years, each of these formulations have been updated several times to keep up with cleanliness standards and demands from the industries Hubbard-Hall serves.

"Especially with the WPS [powder] cleaner, if we stayed with the formulation we had eight years ago, it wouldn't clean as well as the new generation product does," Mazzamaro explains.

With the continuous tightening of the medical industry's cleanliness standards, it is critical that cleaning fluid manufacturers and suppliers are persistent with research and development in this area in order to furnish the latest technology to the industry.

Mazzamaro adds that the medical segment is also expanding from his experience. "There are a lot more medical parts being manufactured in a lot of the job shops that we call on," he says. ■