



Green cleaning as a philosophy and method has continued to gain attention and influence in the U.S. Municipal School systems, Colleges and Universities, Government Organizations and even individuals are increasingly asking for and in many cases demanding by regulation, that the products used to construct, furnish and maintain their facilities and homes be “greener.”

What is “greener?” In a broad sense it simply refers to any practice or material that is safer for personnel to use and has as low an impact on the surrounding environment during its manufacture/construction and use, as is possible, using current technology as possible, while still working for its intended purpose.

While being reasonably easy to define, the implementation of this concept influences everything from the basic molecular structure of the chemicals and materials used, through to the design, construction, completion and occupation of the largest and most complex facilities in the world.

Perma’s participation in supporting this broad reaching philosophy, involves looking at the nature and performance of the ingredients/chemicals, packaging and use procedures for our 100+ facilities maintenance chemicals and coatings, and determining how products that are often already working well and are cost effective, can be changed and improved to be safer to use, more environmentally conscious and provide the most effective balance of performance characteristics possible. A philosophy that has been at the core of our product development since Industrial Floor Finishes was in 1950.

Green Line was developed when over 25 years ago a gentleman who had been working in the draft brewing industry for years, presented us with a popular product that was being used for cleaning draft beer lines and asked if we could simply duplicate it? We were completely unfamiliar with this market but while analyzing the product, we quickly recognized the ingredients and chemistry as being the same as we were using for industrial strength floor and equipment degreasers, grill and oven cleaners, and even drain openers.

Further investigation revealed that almost all of the available products used to clean draft beer lines were of the same nature. Based on caustic soda and caustic potash, they were U.S. Department of Transportation (DOT) and U.S. Occupational Safety and Health Administration (OSHA), regulated, group II, corrosives, capable of causing irreversible burns and damage to skin tissue and mucosal membranes within 4 to 60 minutes. In any container larger than a liter they must be shipped in hazardous materials rated packaging (there is a regulatory exception for packaging \leq 1 liter) and require special Hazmat training to be handled and used.

Even though “green” wasn’t a concept that was on anyone’s mind at this time, it just seemed obvious that there had to be better chemistry for a product that was used to clean the lines and equipment used to deliver a beverage that was consumed by millions of people every day.

The further we investigated, the more areas for improvement became evident. In addition to most of them being corrosive, many were clear or at best a dark blue color that was very hard to see when the time came to flush the lines free of cleaning compound in the low light conditions prevalent in many pubs. The prospect of getting a mouth full of corrosive cleaner if someone didn’t get the lines flushed thoroughly caused me to look at my glass of draft differently. We learned that this was of particular concern in pubs where the lines were flushed out with beer. No one wants to waste beer and money by pouring it down the drain and many beers were quite similar in appearance to the cleaners creating the risk of incomplete flushing.

This was the motivation for making PP22 florescent green. Barring St. Patricks Day celebrations, green beers are relatively uncommon and the dye in the PP22 practically glows in any level of visible light. Also, in the much less likely

event that someone makes a mistake, although a mouth full of PP22 wouldn't be pleasant, it isn't capable of causing the chemical burns and associated injury of the caustic line cleaners.

As evident as this risk was to customers, the risk to the staff doing the line cleaning was more prevalent, as they are continuously exposed to the cleaners at full concentration. Also, US OSHA regulations require that people handling concentrated products that present this type of hazard be provided with MSDS/SDSs and receive training in the dangers, how to handle the product and be given with the correct safety equipment, i.e. face shields or goggles, and gloves. We found that the dissemination of this information was sporadic at best. Most people doing line cleaning had no idea of what they were handling or its hazards. In addition, the companies having staff do the line cleaning, were often unaware of both the safety considerations and the regulatory and legal liability. Instances where employees are injured and have not received the correct information, training and equipment, can face fines by US OSHA of up to \$10,000 per incident. A finding of violation by OSHA, then exposes the company to significant judgments, in the event that the injured employee decides to file civil litigation.

In comparison, Green Line's formulation is not hazardous under the GHS definitions and so it doesn't require hazmat training for employees using it.

Efficiency tests were performed on the final formulation using 5/16" and 1/2", 50 psi pressure rated beer line tubing in service for over 1 year without cleaning. Deposits completely covered and encrusted the inside surface of the tubing.

The deposits consisted of proteinaceous matter, dextrin, mold fragments, and oxalate crystals in skin, flake and granular form. Cleaning efficiency comparisons between a commercially available caustic line cleaning compound and Green Line were determined using an average percentage removal rate using a 2% Green Line solution @ 25° C, with a 2 hour immersion, and a 2 minute clean water rinse at 50° C .

	Caustic Line Cleaner	Green Line
% of deposit removed from 5/16" tubing	55	90
% of deposit removed from 1/2" tubing	40	82

These results indicate that even in neglected lines, if a dwell time can be provided, PP22 out performs the caustic lines cleaners. Without the dwell time, the caustic cleaning solutions were somewhat more effective at "burning" out neglected lines in a shorter period of time with just the circulation cleaning that is commonly used. However, being will to change some procedures to allow the use of safer more environmentally conscience, products is another and important part of the "green" chemistry/cleaning philosophy.

Ironically the biggest impediment to adopting safer and better products hasn't been beer distributors, or draft line cleaning companies, but the brewers themselves. During the 25+ years that Perma has been producing Green Line we have approached various brewers in an effort to obtain "approval" for Green Line and have been met with what may be best described as benign neglect. Generally, the response has been polite but completely unhelpful. Brewers in the U.S. usually require that their distributors use "approved" products to clean the equipment used to dispense their beer, but there apparently is something in the culture of beer brewing companies that makes them simply not care about bringing line maintenance products and procedures into the 21st century. For example, a recent inquiry to New Belgium Brewing made on behalf of a large Florida based distributor to get approval revealed that they don't have a procedure for even looking at anything except caustic products.

Fortunately for Perma, Green Line and draft beer drinkers in the U.S. an increasing number of distributors are willing to be mavericks in serving the interest of their customers and ultimately themselves.