

Despite popular misconceptions, solvents are a legal and safe method of cleaning. Increasingly rigorous environmental standards have given rise to a belief that aqueous cleaning systems are the only available option for washing parts. While aqueous systems are the correct option for some products, it is unwise to completely rule out solvent-based systems.

Older, traditional methods of solvent cleaning have become obsolete. They are unable to effectively regulate the solvent and provide the manufacturing cell operators with an acceptably safe working environment. The regulations that govern solvents are often misunderstood. European and American standards differ on the subject. In the United States, solvents are classified as VOCs (Volatile Organic Compounds) on the basis of their POCP (Photochemical Ozone Creation Potential). In other words, a solvent is regulated as a VOC if the chemical contributes toward the creation of ground level ozone, which is a major cause of global warming. In Europe, VOC classification is based upon the inherent vapor pressure of the chemical, meaning how readily the liquid evaporates into the vapor phase. As an example, methylene chloride is regulated as a VOC in European markets due to its boiling point of 41°C, but does not reach VOC classification in the United States. Still, American companies must deal with health and exposure regulations regarding methylene chloride that are more restrictive than European laws.

The lack of consistency in the health regulations contributes to the confusion over solvents. In the United States, the maximum exposure limit for Propyl Bromide is 10ppm. Meanwhile, in England, the maximum exposure for Methyl Chloride is 100ppm. However, companies in England that are subsidiaries of American companies are often instructed to use Bromide solutions over chloride, due to misconceptions over the safety of chlorinated solvents. US companies are faced with an interesting dilemma. On the one hand, environmentally the VOC cleaners are unregulated. Health regulations regarding worker exposure are very strict, however, so businesses turn to alternative methods such as aqueous solutions rather than navigate the tricky waters of solvent cleaning. Compare this situation to Europe, where the health and environmental regulations are tightly interwoven and the product of many years of research. This allows the European companies to have a clear view of the appropriate ways to use solvents in the cleaning process, compared to the murky waters of American policy.

As European regulators move to cut down emissions from companies, solvents have gained popularity. This may seem counter-intuitive at first. However, the EU has committed to a 20% reduction in CO₂ emissions by 2015, and aqueous systems take much more energy and time to operate than a solvent based system. The aqueous system creates a larger footprint through the amount of energy it takes to actually clean the part, as opposed to the solvents. For this reason, Europe has seen an increase in the use of solvent-based cleaners. This increase has not yet happened in the United States.

Solvent cleaners did not gain an immediate foothold in Europe though. Much like in the US and UK at the current point, when the new environmental regulations began going into effect there was a rush in Germany to convert to aqueous systems. Often German companies converted to aqueous washers with no regard for cost or the long-term suitability of the project. This resulted in many switching back to solvents once they realized they were simply better suited for the task at hand. Currently, the US is in this same phase. Companies know little about the technological breakthroughs, such as the

hermetically sealed cleaners, that emit little waste and recover most of their solvent. They are environmentally friendly machines but companies are still stuck in the line of thinking that believes all solvents to be harmful. Knowing only of the old technologies, which were harmful to the environment, companies disregard the advantages of solvents despite the advances that have been made.

Neither aqueous nor solvent cleaning is inherently better in all applications. The key is to determine which of the two works better for a specific process, and implementing that method. Tossing out the idea of solvents because of environmental concerns is unwise due to technological advances, and blindly applying any method without the proper research is a gamble that does not need to be made.