

Innovation Potentials of Using Solvent-free Industrial Cleaning in Swedish Manufacturing Industry

Erik Sundin, Niclas Svensson, Mattias Lindahl, Mats Björkman and Petra Hammarstedt

Background

Cleaning is often seen as a very chemically and/or energy demanding process within the manufacturing industry. Many restrictions and directives concerning allowable chemicals have been put in force within the European Union. One such example is REACH, which has the purpose of ensuring a high level of protection of human health and the environment, including the promotion of alternative methods for the assessment of hazards of substances, as well as the free circulation of substances on the international market while enhancing competitiveness and innovation.

“Ultra-clean” water is relatively new way of cleaning without the use of chemicals. The method has proven successful, for example, in the cleaning of building exteriors, transformer stations, and tunnels. The Swedish company Servicestaden has successfully employed “ultra-clean” water in the above applications. However, the technique must be further developed in order to meet demands from the manufacturing industry. Bi-products such as salt, lime, minerals, heavy-metals etc. are filtered out of the water resulting in water with very high ability to solve dirt and oil as a result of a very high surface tension in the water molecule. It is a ground-breaking innovation to have the “ultra-clean” water recirculated via filtering techniques; in fact, using “ultra-clean” water through a recirculation system would be a new invention in the manufacturing industry.

Aim

The aim of this paper is to explore the potentials of how “ultra-clean” water cleaning can be used in the manufacturing industry. The overall goals of the project are to reduce manufacturers’ use of chemicals, and also the amount of emissions to landfills. Another goal with the project is to reduce the environmental effects on the manufacturing site, the amount of chemical emissions during manufacturing and the amount of chemical transports from the facility.

Preliminary results

Previous cleaning solutions have been based on finding chemicals that are not yet restricted, and therefore will buy the companies more time and possibilities to expand. It is difficult to introduce a new and different methods or products to a market that has worked in a traditional way for many years. Even though Servicestaden has proved that the “ultra-clean” water works on oil, diesel and some other chemicals, the market is not ready to take the “big step” and switch to the method without scientific verification.

The most obvious environmental effect with this project is the reduction of the use of chemicals in the washing procedure. This in turn results in a reduction of dangerous transports of chemicals, as well as the amount of hazardous waste. Further also reduce the problematic and often expensive waste water treatment. A treatment that not always is effective to all modern chemical substances, i.e. some of the chemical substances are passing untreated straight through the water treatment. The use of cold water instead of hot water in combination with easier waste water treatment will also result in reduced energy consumption.