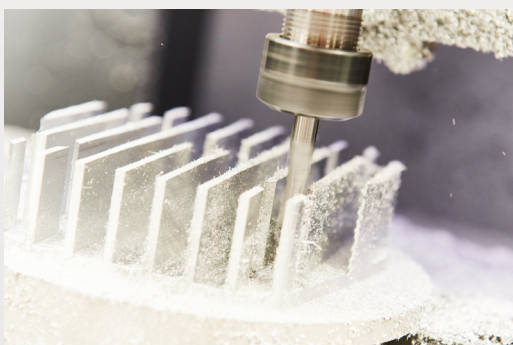


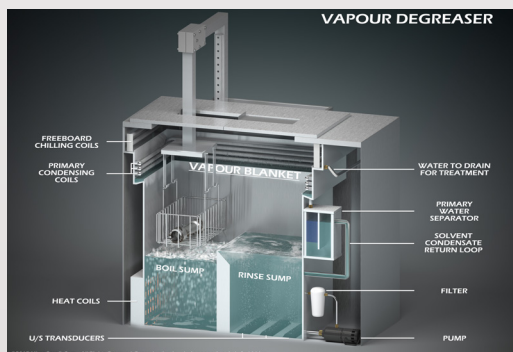
Tech Article

4 Types of Parts Contaminant and How to Remove Them

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Parts become contaminated with oils, dust, metal particulate and other soils during manufacturing



Vapor degreasing is a fast, effective and planet-friendly method for cleaning parts



Over the course of the manufacturing process, parts become contaminated with oils, dust, metal particulates and other soils. To ensure the part's performance, quality, reliability and aesthetics, manufacturers must remove these impurities. The parts must leave the production line perfectly clean, dry and ready for the next stage of production including coating, assembly or packaging. There are two ways to do this. Depending on the type of contaminant encountered, you can use an aqueous-based cleaning system or vapor degreasing with a solvent-based cleaning fluid. Many companies are finding vapor degreasing to be a good alternative to aqueous cleaning. They are discovering that solvent-based vapor degreaser cleaning is a fast, effective and climate-friendly method for cleaning parts. So, as their current aqueous or other type of cleaning system reaches the end of its life cycle, many are considering vapor degreasing as a good replacement option.

Vapor Degreasing Makes a Come Back

Using solvent-based cleaners dissolves greases and removes soils from substrates ranging from steel ball bearings to electronic circuit boards. Solvent-based cleaners were very popular in the 1940s-1980s, but fell out of favor during the 1990s due to evolving regulatory restrictions. In the 1990s, many manufacturers used chlorofluorocarbon (CFC) and hydrofluorocarbon (HCFC) based solvents inside their vapor degreasing machines to clean parts. They effectively removed grease, oils and other industrial soils, however, they also had very high ozone depleting potential (ODP) ratings. By the mid-1990's, their use was highly regulated and was eventually banned for parts cleaning. Many manufacturers switched to aqueous cleaning as an alternative.

Today, vapor degreasing is seeing a resurgence. Especially with the development of new environmentally-friendly cleaning-fluids such as **Opteon™ SF80 Specialty Fluid**. **Opteon™ SF80** combines effective cleaning power with efficiency and sustainability. It is a high-solvency, nonflammable precision cleaning solvent with a low global warming potential (GWP) of less than 2.5. It doesn't contain any fluorinated greenhouse gases and has a negligible ODP. Most recently, nPB (n-Propyl Bromide) and TCE (Trichloroethylene), two of the most commonly used vapor degreasing solvents in the U.S., came under scrutiny as a potential safety risk to workers and the environment. **Opteon™ SF80** makes an excellent replacement for both nPB and TCE. It has an AEL (Acceptable Exposure Limit) higher than 100 and is accepted by key governmental and environmental regulatory agencies in the United States and most countries around the globe. With low odor and low toxicity, it is safer for workers and for the planet, yet without sacrificing cleaning performance.

4 Types of Contaminants – What Works Best?

Developed with both performance and the environment in mind, **Opteon™ SF80** works in a majority of cleaning applications and is widely used in critical industries such as aerospace, defense, automotive, electronics, and medical device manufacturing. But to remove contamination successfully, it is important to match the cleaning fluid to the contaminant itself. It is therefore essential to understand if the contaminant is a particulate, or a non-polar (organic) or polar (inorganic) or soil.

A particulate will not dissolve in water or solvent-based cleaning fluids. It ranges in size from sub-microscopic to a large enough size where it can be seen with the naked eye. As a general rule, the bigger the particulate, the more difficult it is to remove. Insoluble particulates include metal shavings, dust, dirt, cloth fibers,

Tech Article



Environmentally-safer cleaning fluids such as Opteon™ SF80 Specialty Fluid have a low GWP and zero ODP



Opteon SF80™ is ideal for removing organic soils like machining and stamping oils and grease

surfactants, stearates and polishing pastes. A particulate electrostatically bonds to part surfaces and requires a dense cleaning fluid like **Opteon™ SF80** to break that bond. It then displaces the contaminant and floats it off the part substrate.

Organic soils are non-polar halogenated, oxygenated and hydrocarbon soils. Examples include machining and stamping oils, grease, corrosion protection agents and esters, rosin solder pastes and fluxes and baked-on resins. Organic contamination is dissolved and removed with specialty solvent-based cleaning fluids like **Opteon™ SF80**. Due to its low surface tension, low viscosity, and high liquid density, **Opteon™ SF80** effectively wets and cleans all surfaces. It can enter into small gaps and blind holes to dissolve the contaminants without leaving a residue.

Inorganic contamination includes salts, soaps, emulsion residue and graphite. It also encompasses oxidation like rust and tarnish, heat scale, smuts, carbonaceous, and metallic compounds. These soils are soluble in water, so aqueous cleaners are typically better at removing them. Water-based detergents and surfactants emulsify and encapsulate contaminants so they can be washed away.

Water is a subset of inorganic contamination and creates some special parts cleaning and drying situations. Some manufacturers clean parts with water and dry them with ovens, hot air knives or by tumble drying. However, vapor degreasing with **Opteon™ SF80** is an excellent drying solution that eliminates these additional steps. Because of its low surface tension, it can enter small gaps and blind holes, displacing and pushing the water out. Plus, the low boiling point (47° C, 117° F) of **Opteon™ SF80** ensures it evaporates quickly, allowing clean parts to dry fast while using less energy.

Make Your Choice

Many companies are deciding that vapor degreasing, along with modern cleaning solvents like **Opteon™ SF80** has its advantages. It is an effective, efficient cleaning solution that offers affordable and reliable cleaning that also meets your compliance requirements and helps you achieve your sustainability goals. When considering a move to vapor degreasing or a switch to a more environmentally-preferred cleaning fluid, be sure to consult with the **MicroCare Precision Cleaning Experts**. They specialize in vapor degreaser solvent cleaning and can recommend the best processes and cleaning fluids to use including the **Opteon™ SF80**.

About the Author:

Venesia Hurtubise is a Technical Chemist at MicroCare which offers precision cleaning solutions. She has been in the industry more than 6 years and holds a MS in Green Chemistry from Imperial College. Hurtubise researches, develops and tests cleaning-related products that are used on a daily basis in precision cleaning and medical applications. For more information, visit www.microcare.com.



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