

Solvents, Cleaner Does Not Mean Safer

Sometime in 2009, a prominent electronics manufacturer in Taiwan made a calculated business decision in order to reduce costs and improve output. They found a substance that had multiple applications and was inexpensive. The substance was *hexane*, a colorless liquid hydrocarbon that evaporated easily, and is used predominantly as an additive in automotive fuels, an ingredient in glues, and a cleaning solvent.

The company, WinTek, one of the primary manufacturers of touch screen products for Apple, Inc., used hexane as a cleaning solvent and to glue logos and other items onto the products. According to an ABC News story in late Oct. 2010, a large number of the employees who handled the hexane had to be hospitalized from poisoning. Their symptoms started with simple dizziness and numbness in various body parts, which eventually developed into nervous system impairment to the point that they could no longer walk. At one point 60 workers were hospitalized and many spent well over 6 months in the hospital recovering, hoping that their nervous system would heal and that there would be no permanent damage.

The company, realizing it had made an error in not accounting for the health and safety hazards of hexane, paid all of their worker's hospital bills and ceased using hexane in its production facilities. Though the company has recovered in a financial sense, many of the workers must now spend the rest of their lives in pain or impairment. The lesson here is that the disregard for human health always has a higher cost.

Probably one of the most persistent ironies in America is the use of toxic chemicals to clean our homes and our personal belongings. When it comes to machinery and such items that require servicing in order to continue operating properly is understandable, but the use of toxic substances to make your kitchen clean is not only ironic, but also dangerous.

An example of this mindset has actually been gaining a larger awareness and a new industry has developed because of it: non-toxic and environmental dry-cleaning. While at first this may sound like some kooky idea that could only have been dreamed up in California, there is a lot of merit to this. For many years there has been a concern over the use of a number of chemicals in the dry-cleaning industry and the health hazards it poses to workers in those environments. While there is also risk to consumers who exposed to these chemicals in their freshly dry-cleaned garments, the health effects are substantially greater in workers.

The main culprit is tetrachloro-ethylene, which is known by a number of names including PERC. This is a chemical solvent that removes the oils, grease, dirt from dry clean garments and remains in trace amounts on the clothing when delivered back to the customers. It is classified as a probably carcinogen, and there is also evidence, mainly from the Parkinson's Institute in Sunnyvale, CA, that suggests that PERC may also be linked to Parkinson's disease. Similar to hexane, PERC slows the central nervous system either when inhaled or from topical exposure.

In low concentrations on the skin, it can cause a number of dermatological reactions including itching, redness, and other forms of irritation in sensitive people.

As people have become more aware of the toxicity of the chemicals involved in most dry cleaning facilities, several alternatives have reached the market and still new methods are currently being developed. While some alternative dry-cleaners advertise themselves as non-toxic, some independent researchers have found that they have simply switched from using PERC to another similar hydrocarbon solvent that is similarly toxic.

The word “solvent” comes from the Latin word “solvere” which means “loosen”. A solvent is simply a substance that breaks a substance down and forms a solution with it. In a purely scientific sense, water is a solvent. Depending on its temperature it has the ability to dissolve a substance and form a solution. Unfortunately, hot water won't degrease an engine very well, and therein lays the problem. In the technological aspect of our modern lives, we are dependent upon more aggressive chemical answers to our problems.

For example, think of your bathroom. If you only used hot water to clean your bathroom, how clean would it feel to you? Are you the type of person that imagines all the bacteria and nasties growing all over the surfaces? Are you the type of person that wants the strongest cleaner on the market, the one that requires a rubber suit and an oxygen tank and nukes every surface in the room with the force of a hundred helicopter gun-ships? Laugh all you

like, I'm sure all of you at least know one person in that category.

Even if you aren't a “clean-freak”, chances are that you still use cleaning products that contain harmful solvents like Pine-Sol and Windex. But how can you ever make anything clean unless you use cleaning agents? There are an ever growing number of cleaning supplies that are not based on petroleum products or use toxic hydrocarbons and alcohols as solvents. For example, there are a number of spray cleaners that use plant-derived aids to dissolve grease and remove spots and stains. You might also be surprised at how well you can clean glass with a little water and white vinegar.

Because there are literally hundreds of different solvents, both “organic” meaning they occur in nature, and “inorganic”, that a comprehensive list of all of them and their toxic effects is well beyond the scope of this article. However, many of the most common solvents share some similar properties and their toxicological effects are similar.

Harmful solvents are most often aromatic hydrocarbons or rapidly evaporating alcohols like methanol, ethanol, and are easily inhaled. Inhalation is perhaps the most common exposure route, causing respiratory impairment, lung disorders, nausea, dizziness, and other symptoms.

The other common exposure method is from absorption through skin contact. It is well known that most solvents are skin irritants and prolonged exposure can lead to a number of serious dermatological conditions.

Ingestion is easily the most serious case of exposure. Depending on the amount ingested, the worst-case scenario is death, in order of descending severity: cancer, nervous system impairment, liver/kidney disorders, and other serious conditions. This is not to say that chronic, long-term exposure from inhalation or topical contact will not also cause similar conditions, only that ingestion can manifest these symptoms more acutely. There are documented cases where solvent fumes have caused death.

If you have been exposed to a large amount of solvents over your lifetime, it may be in your interest to consider doing a detox program. Depending on your genetics, your body may be more or less sensitive to different types of solvents and may have stored large quantities of them in your fatty tissues and organs. In order to remove these from your body and not over load your system by re-circulating them, it is important that you follow the instructions of a specialist who is familiar with your genetics and medical history and is an expert in detoxification of the body and organs, not only the liver.

It is also important to determine your genetic capabilities in processing these solvents. Some people have stronger genetic resistances and can withstand larger amounts or prolonged exposure much better than someone else who may look just like them. Effective and relatively inexpensive testing is available that can answer these questions.

Besides detoxifying, reducing your exposure to the greatest extent possible (there are solvents in the

atmosphere from industrial pollution and automobile exhaust) is your best option. To do this you need to observe the areas of your life where you will most likely be exposed. Your workplace, what is it cleaned with? Do you dry clean often? What do you use to wash your clothes? What cleaning supplies do you use in the home? How is your car cleaned? Do you have any hobbies that expose you to solvents? These are the questions you have to ask yourself and find the answers to improve your life, because an aesthetic appearance doesn't mean clean or safe.

You have to make a choice, just like the company in Taiwan. They chose not to consider the health implications of the product they were using and they ended up paying the cost. One day you may have to pay the price for the choices you make. Considering the health and well-being of you and your loved ones first is always the right way. There is a saying, "Clean hands make a happy life". More accurately would be, "A healthy life, makes a happy life."



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