

Why....

....do paints flow?

....does the ink of this factsheet not smudge?

....can I apply perfume?

....can I see through my car window?

The answer is solvents: a liquid which has the ability to dissolve, suspend or extract other materials. Solvents make it possible to process, apply, clean or separate materials. Solvents have significantly changed modern living and are an invaluable solution for industries as diverse as pharmaceuticals and microelectronics to domestic cleaning and printing.

Organic solvents can be classified into three groups based on their chemical structure:

- **Oxygenated solvents** - Substances like alcohols, ketones, esters, and glycol ethers fall into this category. These types of solvents are used when high solvency power is needed. They can also be used for water based formulations such as detergents and water-based paints.
- **Hydrocarbon solvents** - These are paraffinic, aliphatic and aromatic hydrocarbons. They are typically used in applications where there is low solvency power and good separation from water is required.
- **Halogenated solvents** - This category consists of chlorinated hydrocarbon solvents. To obtain more information on these solvents please visit the Euro Chlor website: [www.eurochlor.org](http://www.eurochlor.org).

An organic solvent contains carbon molecules - one of the basic building blocks of life. Water is also a solvent but is classified as *inorganic* because its chemical structure does not contain carbon.

## HOW ARE SOLVENTS MADE? WHERE DO SOLVENTS COME FROM?

With the exception of alcohol, all solvents are produced from oil. The amount of oil used for solvent production is, however, relatively low. Only about 1 - 2% of the world's oil production is used for solvent production. Many solvents are also recycled so that they can be used again.

## HOW DO SOLVENTS WORK?

Solvents are liquids that are used to dissolve other substances. Water, for instance, is also a solvent and it can dissolve many things but it cannot dissolve oily/greasy substances. Solvents work on the principle of "like dissolves like" e.g. solvents are chemically much more similar to greases than water and can therefore dissolve them more effectively.

## WHERE AND HOW ARE SOLVENTS USED?

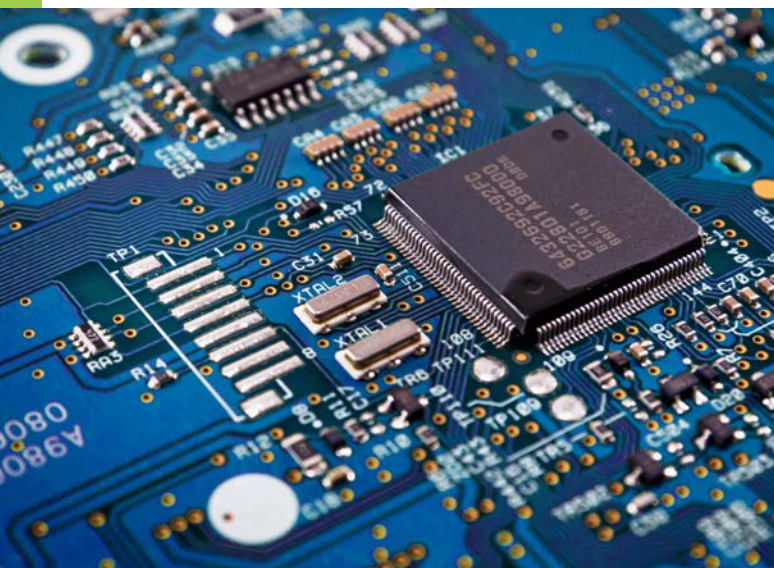
Thousands of producers and manufacturers and over 10 million workers in Europe rely on solvents every day. From penicillin to industrial paints, without solvents many of the products we rely on would not perform to the standards we demand today. Solvents are used in the following:

**PAINT, COATING AND INK** - Once the paint has been applied the solvent evaporates, allowing the resin and pigment to produce a film of paint that dries rapidly.

**PRINTING** - Whether magazines or food packaging and labels, they all need to be printed and solvents help these printing inks to be applied, stay put, and stay bold and bright. In printing inks, solvents are used to control viscosity (thickness) and to allow ink to flow without damaging printing rollers or sprayers. Solvents assist in optimal drying for today's high speed printers.



**ADHESIVES** - Solvents are used in domestic and industrial adhesives and are particularly effective when a high performance is required in the case of applications such as metal-to-metal bonding and products such as footwear and car tyres.



**PHARMACEUTICALS** - Used for the manufacturing of many health care products such as penicillin, aspirin and cough syrup as well as hundreds of other pharmaceutical products, solvents provide molecules to build drugs and are also used as a reaction medium, for extraction and purification

**SKIN CARE, SOAPS, HAIR CARE** - In many products, solvents such as alcohol are used to deliver active ingredients, antibacterial agents and fragrances. Some solvents can form appropriate carriers for skin care products.

**PERFUMES** - Nearly all perfumes are alcohol-based. Spraying perfume in the right place, and for the right duration only happens because of solvents. Fragrance oils from fruits, flowers, roots or bark are also extracted and purified using solvents.

**AGROCHEMICALS** - Solvents play an important role in crop protection by dissolving the active chemicals in pesticide formulations. The solvents help crop protection agents work efficiently by drying at a slow enough rate to allow adequate absorption, but fast enough to ensure efficient action.

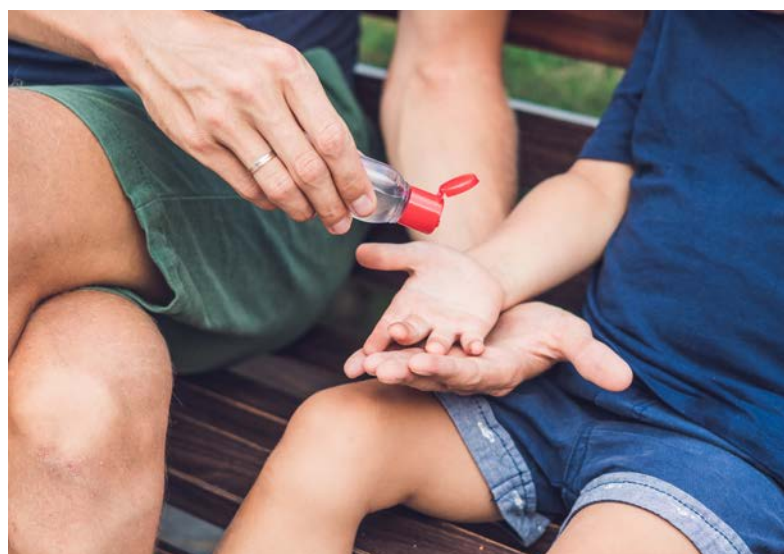
**FOOD AND DRINK** - In food processing, solvents are used to extract the substance from natural products e.g. fats and oils for making margarine, flavour extracts such as caffeine from coffee, and sugar from molasses. In addition, solvents are also used to make the plastic packaging which keeps food fresh and clean.

**AUTOMOTIVE** - Solvents play an important part in making car travel safe by, for example, preventing fluids from freezing in winter and helping the windshield washer fluid dissolve dirt on the window, rapidly without residue.

**MICROCHIPS** - The microelectronics industry uses electronic-grade solvents (i.e. solvents with very low levels of metal ions) to produce microcircuitry and to clean sensitive components.

**HOUSEHOLD CLEANING PRODUCTS** - The solvents in household cleaners helps us clean our kitchens, showers, toilets, carpets and other household items. For example, solvents used in dry cleaning machines help clean our clothes by dispersing and dissolving dirt. Solvents also help with disinfectant tasks by lowering surface tension and enabling the disinfectant to get into all the nooks and crannies of the surface. Solvents give products a longer shelf life and also ensure product stability: the first capful is as effective as the last capful.

**INDUSTRIAL CLEANING PRODUCTS** - Solvents are also used in the cleaning of high precision mechanical parts such as ball bearings: for this application, perfect cleaning is essential to the proper functioning of the mechanical piece (remaining dirt would damage the metal) and critical to the safety in the application.



**HOSPITALS** - Solvents offer an alternative to traditional washing with soap and water through the use of alcohol-based antiseptic gels and rinses which reduce bacteria. These antiseptic gels are also very portable and can be placed in every patient's room, allowing staff to reach for a hand pump and disinfect in a matter of seconds.

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