

# VOCabulary

## volatile organic compounds

### Public Enemy Number 1

Whether or not you subscribe to the theory of global warming, everyone agrees that industrialization impacts our planet in one respect or another. The abundance of chemical compounds floating in our atmosphere and oceans, mixing through the soil has created an unsustainable cycle. The net result will be a changed Earth, changed ecosystems and subsequently changed life styles.



### Volatile Organic Compounds

VOC's are hydrocarbon chains (C-H) that vary in structure, but exist as gases at room temperatures. Although present in many utilities, this monograph will focus on the role VOC's play in paint.

A liquid can of paint is sold from the paint store and taken to a wall or ceiling for application. Upon application, the paint begins to increase its viscosity (drying). This is occurring because the liquid portion of the paint (known as the vehicle) is evaporating, but the resin portion (known as the solids) remains. The result is a solid paint film garnered from a liquid can of paint – sounds like magic, right?



Magic? Maybe. Organic chemistry at work? Yes. When organic compounds are added to a resin system, the resins begin to take on a liquid phase. The organic compounds are small enough to surround the resins and increase their mobility – mobility of the resin is the only chemical difference between

it existing as a gas/liquid/solid. The compounds are designed to evaporate at room temperature, causing the resin particles to draw closer to one another – thus reducing mobility and becoming what we know as a solid paint film. VOC's are used to support this film formation.



### How they effect the Earth

This is a topic of much discussion. Suffice it to say, there is a correlation between the existence of VOC's floating around in our atmosphere and the decreased quality of the air we breathe. Southern California, known for its ideal climate and scenery, also has the unfortunate identity as being a smog zone. Smog is a concentration of atmospheric pollutants that forms a haze. Smog is the product of chemical reactions between VOC's and nitrous oxides (industrial output) stimulated by the sun's UV energy.  $CH + NO + UV \Rightarrow SMOG$ .

### What the EPA is doing about it

The [Clean Air Act](#) passed by Congress in 1990 empowered the EPA to enforce restrictions on companies in effort to reduce the amount of VOC's into the atmosphere, thereby limiting one of the factors in the smog equation. This has affected the paint industry in a number of ways. By reducing the amount of VOC allowed in a given gallon of paint, entire reformulations were necessary and some well performing product lines were discontinued.

The can of paint purchased back in 1989 looks, feels and is applied differently than one purchased in 2009. An entire new generation of coatings is being developed, and along with it, new application guidelines.