



What are VOC's

VOC's (volatile organic compounds) are the talk of our industry with manufacturers such as Aqua Mix producing mostly either low or no VOC formulas. However many manufacturers internationally still offer products with very high VOC's so why is this such a potential problem? The answer is that VOC's have a damaging and negative affect on the environment.

There are two basic definitions for VOC's. The US EPA (environmental protection agency) defines VOC's as "any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate, which participates in atmospheric photochemical reactions". This definition also includes a list of a number of exceptions for compounds "determined to have a negligible photochemical reaction". The Europeans however have through the European Parliament decided to define VOC's not by reactivity but instead by a compounds ability to evaporate into the atmosphere. So as you can see the actual regulatory definition of a VOC is based more on politics than science. If we look strictly at the science the definition is perhaps a little more concise in that a VOC is an organic compound that has high enough vapour pressure under normal conditions to vaporize (not necessarily completely) into the atmosphere. Whichever definition you take the most important fact is that VOC's are a specific group of compounds that vaporize into the atmosphere creating long term damage to the environment.

The most common VOC is methane coming from such diverse sources as wetlands, animals such as cows, energy use, landfills, agriculture, etc. However the group our industry is directly involved with is the artificial VOC's such as solvents used in sealers, paints and other coating products, and indirectly those that can be emitted by plastic containers and packaging due mainly to their petroleum content. Other VOC's that we come into contact with are those that are created by oxidization from sources such as carpets, photocopiers and furnishings. So there are a lot of potential sources, but what damage do they do to the environment?

The most commonly held view regarding the damaging affect of VOC's is that they create air pollution and hence contribute to both global warming and greenhouse gases. The methane based VOC's contribute directly to greenhouse gases as methane is one of the most efficient greenhouse gases of all. Greenhouse gases are required by the planet to regulate the earth's surface temperature. However if the quantity of greenhouse gases becomes too great then they trap heat dramatically increasing the planets surface temperature – this is what we refer to as global warming. Venus is a good example of this where the atmosphere is 96.5% carbon dioxide (a green house gas) creating a surface temperature of 467 degrees Celsius. Some VOC's react with nitrogen oxides in the air, along with sunlight (photochemical reaction), to actually create ozone. Ozone is very important in the upper

atmosphere, protecting the planet from potentially damaging UV rays. However when ozone is formed at ground level it becomes a health threat to humans (especially respiratory problems) as well as damaging plant life. The newly created ground ozone also has the ability to prolong the life of the damaging methane in the atmosphere.

In addition to all of this some VOC's such as aromatic compounds like benzene, toluene and xylene are carcinogens linked to leukaemia. The bottom line is that VOC's are not desirable for a number of reasons and is why manufacturers like Aqua Mix have historically formulated their products to minimize the content of damaging VOC's. It is certainly not the case that all manufacturers and countries follow this lead. Unfortunately there are still a number of sealing and cleaning products worldwide that contain high levels of VOC's and some of them still contain the very harmful aromatics such as toluene and xylene. With modern technology and vigilant regulators harmful VOC's are slowly being removed from our industry. There is no doubt that the USA leads the way in removing harmful VOC's from the market and manufacturers like Aqua Mix welcome this.