DATA SHEET

WATER-BASED & LATEX PAINTS

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WE'VE COME A LONG WAY? Water-based and latex paints, lacquers, and varnishes are available for almost all purposes from household uses to special theatrical paints and coatings. They are safer than the old solvent-based products. The old paints released so much solvent vapor that a day's painting could leave you high as a kite. Some work days amounted to paid time for glue sniffing!

But it is a mistake to think that the new paints and varnishes have no hazards. This data sheet will reinterpret the labels and material safety data sheet (MSDS) information with greater accuracy.

WATER-BASED LABELS. When water-based products were introduced in the 1980's, they usually contained water plus solvents. Often those solvents were the extraordinarily toxic primary glycol ethers known to cause male and female reproductive damage. These solvents can be absorbed through the skin, they penetrate several types of heavy chemical gloves without changing the gloves' appearance, and they can be inhaled as the paints dry or are sprayed.

Some of the early water-based products were actually more toxic than the solvent products they replaced! Today, I rarely see these highly toxic solvents in paints. But water-based paints usually do contain other solvents, including less toxic members of the glycol ether class and which are suspected to cause reproductive damage. You should translate the label on water-based products as follows:

> **"WATER BASED" REALLY MEANS: In addition to water, the product also may contain solvents and other toxic ingredients. Get the MSDS for more information.**

INGREDIENTS LISTED ON THE LABEL. Most cans of water based, consumer paints list 4 or 5 ingredients, the first of which is water. Also likely to be listed is Titanium dioxide or some other white pigment, the type of latex emulsion in the paint such as acrylic latex or vinyl latex, and ethylene or propylene glycol (anti-freeze) to keep the emulsion stable in cold weather.

Titanium dioxide is now listed as a carcinogen by the International Agency for Research in Cancer, but it appears to be toxic only by inhalation. So sanding or spraying these paints should be done with ventilation or respiratory protection. The amounts of anti-freeze are usually not high enough and evaporate too slowly to be a hazard during brush painting. The acrylic or other plastic emulsion base for these paints, however, contains many, many chemicals, some of which are hazardous.

THE OTHER UNLISTED CHEMICALS. The most toxic of the unlisted chemicals are the biocides–better known as pesticides and fungicides. Without biocides, paints would rot in the can and paint films on walls would be attacked by fungus and bacteria. There are two types in almost all paints:

1) biocides to protect wet paint in the can and which usually evaporate into the air as the paint dries; and
2) biocides which remain in the paints to protect the dry film.

In addition, latex paints may include any of the following:

adhesion promoters
antioxidants
anti-sag & settling agents
anti-skinning agents
anti-static agents
coalescing agents (e.g., Texanol)
defoamers
dispersants
driers (to speed drying time)
emulsifiers
flame retardants
flatting agents
flow modifiers
freeze-thaw stabilizers
light stabilizers
mar and slip aids
moisture scavengers
pH (acidity) control agents
plasticizers
rheology modifiers
rust inhibitors
surfactants (detergents)
UV (sunlight) absorbers
wetting agents

Most of these are complex chemicals with names as long as your arm. Most have never been tested for their effects on people. Some are expected to be toxic based on their chemical class. In addition, chemicals like these for which there are no toxicological data can be labeled "nontoxic" by manufacturers!

One example of these additives is a solvent called Texanol®. It is one of the most common coalescing agents in water-based paints and listed on many paint material safety data sheets (MSDS). This solvent is 2,2,4-trimethyl-1,3-pentanediol monoisobutyrate. There is almost nothing known about this solvent–and certainly no chronic or long term testing has been done.

These often are the chemicals that cause symptoms in some people even though the label and MSDS indicate there is nothing toxic present in the paint they are using. To be safe, never think of an ingredient label as inclusive of all the substances in the product. Instead realize that:

INGREDIENT LABELS REALLY MEAN: these are the substances the law requires to be listed, but there are dozens of other chemicals present. Chemicals known to be toxic must be under 1% or they must be listed. But completely unregulated and untested chemicals also may be present in even larger and more significant amounts. Some unlisted chemicals can cause odors, allergies, irritation, and even toxic effects if you are exposed.

WHAT ARE "VOCs?" Strictly translated, VOC means "volatile organic chemical." Some of us try to avoid solvents by using products labeled "contains low VOCs." But VOC label term only refers to solvents that are regulated because they create smog or damage the ozone layer. Many solvents such as acetone and ethyl acetate react negligibly in the atmosphere. These are called "exempt compounds" and are not labeled as VOCs.

> **"NO or LOW VOCs" LABELS REALLY MEAN: solvents that will react in the atmosphere to create smog are not present in this product, but the product can be full of solvents that don't create smog and which are toxic to users. Get the MSDS.**

NO REGULATED INGREDIENTS. MSDSs from some paint manufacturers do not list toxic ingredients that are present in amounts of 1% or greater as the law requires. Never believe an MSDS that says there are no OSHA regulated ingredients in the paint. Titanium dioxide–the common white pigment is regulated. Ethylene glycol is regulated. There is almost always going to be something that will meet the criteria for a chemical health hazard which OSHA defines as any chemical for which even one study, including an animal study, indicates it could be harmful.

NO REGULATED INGREDIENTS & VOC DATA. Using the VOC data listed either on the label or the MSDS, it is possible to figure out the percentage of unlisted chemicals that are volatile chemicals (e.g., solvents). First, you will see two sets of figures, one for Coating VOCs and the other for Material VOCs. Both will be in units of grams per liter (g/l).

Coating VOC calculations are "artificial" and used to regulate pains. But the Material VOC is the actual or real amount of VOC that the paint contains. Assuming the paint weighs about the same as water (it is mostly water) and knowing that one liter of water weighs roughly 945 grams, then you can use the formula: g/l VOC x 1/945 g/l x 100 = ~% VOCs.

For example, one water based paint MSDS that listed "no reportable ingredients" also said that the there were 96 g/l of Material VOCs in the paint. And 96 g/l x 1/945 x 100 = ~10 % VOCs

So, 10% of the paint is EPA-regulated volatile organic compounds known to be toxic to the environment. Even 1% of a toxic ingredient is required to be reported under OSHA regulations. The actual percentage of solvents in the paint is probably greater than 10% for two reasons:

1) The paint is probably not as heavy as water and the lower that weight, the greater the % VOC. (If the MSDS provides the specific gravity of the paint, a better estimate can be calculated.)

2) VOCs are only the EPA regulated solvents. There could be other solvents such as acetone, ethyl acetate, etc., that are not regulated by EPA but are still toxic to people.

SUMMARY. Do not accept at face value the labels, MSDSs, or claims made by paint companies. Always try to verify as much as you can about the actual ingredients in the paint. And remember, no paint, varnish, or surface coating can hurt you if there is enough ventilation to take the vapors or spray mists away from you and if you keep if off of your skin. Take precautions. When in doubt about a product, contact your Safety Officer (see page 1 letter head).