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## Non-toxic Paint 101

### Introduction

Many of us are blissfully unaware of the paint & coatings chemicals we are exposed to everyday. Unfortunately, many in the industry are also naïve when it comes to the common ingredients in conventionally made paints. This page is intended as a brief education for those who are interested, and a reminder that the complex chemistry of coatings needs to be monitored carefully by both users and producers alike. We are a petrochemical based society, but there are many areas which are turning to bio-friendly alternatives. With the help of Earthpaint, paintings and coating are heading in the right direction though the high production of toxic, dangerous paints continues.

We believe the best tool for change is education. An educated public demands non-toxic paint and knows what that means. But even if we demand non-toxic, sustainably made paint, we don't want to have to compromise on performance. The truth is that many toxic petro-chemicals generate a well performing paint, but ultimately they cause more harm than good and they aren't all essential. What we need is to eliminate the toxic chemicals and make limited use of those that are useful. This is what we are doing at Earthpaint Inc.



When weighing out the use of chemicals, it can be sobering to realize that each time we get in a car (say to buy non-toxic paint) we are directly spewing at least 13 high priority toxic substances into the air including formaldehyde, benzene, arsenic and dioxin/furans. Petro-chemicals are in our clothes, shoes, toys, bikes, food, packaging, heating oil, baby clothes, baby bottles, coffee cups, underarm deodorants, skin care, make-up, candles...

Additionally, when we use electricity we sanction the largest mercury polluters on earth: [Coal-Fired power plants](#). In 1999 an estimated 17 pounds of Mercury was emitted from our Asheville plant alone, with a total of 2720 lbs emitted in North Carolina. We are at a turning point, but a solution to these issues has not fully materialized yet.

### Color



Most pre-dispersed colorants contain toxins. People often think that "natural" pigments are the answer, but raw pigments (or earth pigments) can also contain substantial levels of toxicity. Ironically, the dust from raw earth pigments is often more toxic than organic (synthetic) pigments. While raw pigments often perform excellent in UV Radiation tests, they can be notoriously difficult to disperse properly into paint without expensive grinding mills. Lead, cadmium, arsenic and other natural metals can be found at greater levels in many raw earth pigments. If care is taken to protect against the pigment dust, most people can work with raw pigments in material such as plaster, but creating quality non-toxic paint is more complex. There are few, if any, completely non-toxic colors that are appropriate for paint.

Solvents are usually added to pigment dispersions to make them stronger, more affordable. Many of these solvents are toxic like ethylene glycol. [Alkyl Phenol Ethoxylates \(APES\)](#) are a problem for human and aquatic life worldwide, yet APES are in many colorants. If you buy non-toxic paint and have a few ounces of color added using toxic colorants -you now have toxic paint. Lighter colors or whites are a less toxic way to go, while darker colors use more colorant making them more toxic.

#### Color Matters.

The fact is, finding just the right color usually takes precedence over health or environment when choosing paint. For many of us, the final color is the most important part of a project. It's often why a project got started to begin with -to

redecorate. Occasionally, choosing non-toxic means choosing a slightly different color than expected and sometimes people opt for a more poisonous paint, just to match their color choices exactly.

In order to deal with these mainstream tendencies, and make going 'green' as easy as possible, Earthpaint Inc has collaborated extensively with some of the world leaders in color. We asked them to help us to produce a line of colorants that don't pollute the waterways, poison the air or create toxic hazards from manufacture to landfill. We then worked with computer color engineers to develop color matching formulas with these non-toxic colorants.

A "Low VOC" Colorant does not mean it's low odor or made without toxins. The leading "low VOC" colorant that we looked at in the lab has an odd diesel like smell to it. When asked what this is we were told "Its proprietary". Well, that doesn't sit right with us. So we went with a colorant that is made out of mostly earthpigments and low toxicity, organics which are nice and bright.

### **There IS a Non-toxic Color Solution!**

So, it brings us great joy to say we have designed a non-toxic color system. This system allows customers the opportunity not only to tint our wall paints and concrete sealers, but also to tint the Level One green products such as Venetian Plaster and Wood Finishes. They will match any color in the world! Ask your local retailer to use this system to avoid toxins from traditional paint tinting. We have this system in our lab and our retailers. We will custom tint paint for people until they can get the local store to switch over. Public outrage will drive this change. Customers need to say they will buy non-toxic colorants in order for retailers to feel safe about making the change. In many countries color is paid for seperately and it can be very expensive.

Here in the U.S. we have enjoyed very cheap color. As with most products, the prices may need to be balanced out a bit to more accurately reflect the cost of responsible production methods.

## **Paint & Resins**

**Clay Paint** - Most interior paints contain some percentage of clay. It is commonly used as a filler -for body, texture, dry hiding, smoothness and the like. Clay without a resin is dusty and chalky on a wall so it requires a balance of resin, solvent and other additives to keep it from failing. Cheap builder grade wall paints often have a lot of clay and very little resin. This makes a good hiding paint but it does not hold up well since it absorbs dirt easily, isn't very washable, and peels easily when moisture or future coats are applied. This kind of paint is used because it's very flat and very affordable. The latest trend in "Clay Paint" appears to be this type of paint -a low resin, high filler, flat wall paint.

Earthpaint Inc was asked to examine some of the Clay Paints available in the US and Europe. Ingredient conscious customers wanted to know what was really in the clay paint they were considering for their projects. We looked at several types.

The only Clay Paints that seemed to be honestly representing their ingredient list was a US company using a soy-based resin. However when we tested clay and soy resin together they tended to make a rather greasy feeling wall paint. This was a reasonably sustainable and non-toxic paint despite its difficulties.

We also looked at a European Clay Paint that is shipped into the US. It worked well as a flat paint. We were unable to find honest representation of the ingredients from this line. A common VOC or solvent (alcohol ester) was listed and claimed to be a "binder" which obviously it's not. It's a solvent and helps to coalesce a film. Some form of acrylic, styrene or vinyl resin appeared to be the actual binder but we were unable to determine exactly which one.

Additionally, a biocide was added but no indication of the toxicity of this biocide was listed. Is it formaldehyde based? We don't know. It's hard to tell the difference from this Clay Paint and \$15/gal builder grade flat paint. It's hard to say it's sustainable in the U.S. because of the poor lifecycle and high embodied energy mostly from shipping. More importantly, it doesn't meet our standards for a non-toxic paint since we have strong doubts as to the ingredient list accuracy.

**Clay Paint Bottom Line:** Be careful about what you're getting. Don't fall for the hype. Pick the [Green Level](#) you want to strive for and choose a paint that meets those requirements. Ask for a full list of ingredients, otherwise don't buy it. If you want the most benefits of clay, use Clay plaster. If you want the ease of paint and look of clay, use homemade Earthpaint, or a *true* clay paint with a hardener applied over top. This will be washable, long lasting, non-toxic and sustainable. Use soy resin clay paint if you don't want acrylic. Use non-toxic pure acrylic if you want the easiest solution to clay paint, but realize it's essentially just flat wall paint without the poisons (hopefully).



**Deck Stain** - Many [deck stains](#) contain serious toxins and are dangerously poisonous to people and the planet. Even stains touted as environmentally friendly will contain over 200 g/L VOC. Some contain ethyl benzene, while others will be full of ethylene glycol. Argh! Use high solids, low voc deck stains without petrochemicals or toxic synthetic biocides. Wash a deck once a year to cut down on black mold, which is otherwise unstoppable and a key player in biodegradation. (See below)





**Black Mold** - Seen as mildew or dark spots on shady, moist areas. Cannot be stopped. Some things will prohibit it's growth better than others and this is essential but eventually everything will rot. Black mold will grow on vinyl, aluminum, plastic, rubber or anything else that gets dirt on it. Dirt serves as the food and the mold then begins to eat into the surface of whatever that dirt is on. There's no sense using synthetic biocides that are toxic when they only prevent mold until dirt gets on the surface. Wash the surface. Use natural minerals and elements

that are inorganic and don't break down easily to fight bio growth. And accept that we don't want to create some chemistry that stops the natural cycle of bio degradation.

**Polyurethane** - Most always toxic. Most always plastic in some form or another. **Even the waterborne polyurethane can be very dangerous.** [The process of making polyurethane has been known to cause dioxin to be created.](#) Dioxin is one of the most poisonous substances on earth.

Waterbased Polyurethane is derived from petrochemicals. It's more or less a plastic. Because it gets very hard it has it's uses but is entirely overused at the expense of indoor air quality and ground level ozone. It ought to be kept for specific applications where it is best suited such as industrial floors or the like. Schools should not use polyurethane if they can avoid it because most manufacturers include solvents like ethylene glycol in their poly. Many waterborne polyurethane's are available but they may have NMP or TEA in them. These are toxic amine smelling solvents. NMP is can be very dangerous to pregnant women and unborn babies.

The sanding and dust generated from polyurethane recoating is toxic and lingers in cracks and crevices nearby. When poly gets old it looks cheap and plasticky, creating a plastic barrier around the wood. Plastic has it's place but we *don't need to coat the earth in it*. One Coat Wood Finish and Mountain does the job for interior wood naturally. Bio Poly is absolutely gorgeous.

There may be some good polyurethanes available and when we are sure they do not cause dioxin we will review them. However, they will also need to be [more fire retardant](#). Smoke from polyurethane can emit extremely toxic substances and tends to ignite quickly.

The best thing about poly, is how hard it gets. It gets harder than most other coatings. It is appropriate for industrial use occasionally. There are some high solids polyurethanes for industrial use but these are expensive and must be applied with special care. We don't suggest poly for residential use or for small businesses. Coating wood in this plastic seems like a waste since it looks poor and fails quickly outdoors. There is simply too high a price paid envirosocially, for the few benefits of polyurethane. Natural wood finishes are much better choices.

We are currently developing a natural resin-based polyurethane that will be non-toxic and get as hard as modern polyurethane.

**What we use:** Mountain. The worlds only 100% Natural Urethane! Natural Oils and resins, Select Pure Acrylics

**We stay away from:** All polyurethane but especially watch for N-methyl pyrrolidone (NMP) which can be very dangerous to [fetal development / pregnancy](#). This is in many waterborne and oil based polyurethanes and smells like ammonia. Also, TEA, ethylene glycol and most all [petro-chemical solvents](#) except perhaps propylene glycol.

**Acrylic Paint** - [Pure Acrylic](#) resin makes a high quality, waterborne house paint. Most commonly made acrylic paints are made with numerous toxins. It can be non-toxic but is seldom made this way by conventional paint makers. Poisonous Biocides, Sulfates and Solvents are often added to acrylic along with co polymers that often are made from cheaper, more toxic methods.

Acrylic resins are a binder in many paints. They make paint stick and shine. They are often referred to as "latex", not to be confused with natural latex rubber which can be highly allergenic. Latex in this case refers to the molecular formulation of a latex emulsion, usually rubbery resins with water content of approximately 50%. Latex particles are so small that a thimbleful could span the distance from the earth to the moon if they were lined up, almost 400,000 kilometers. Acrylic paint resins are usually from these types of acrylic latex resins.

Pure Acrylic is biodegradable and has very low toxicity ratings as demonstrated in lab tests on lab animals (rats, rabbits, mice). Scientists have little data on human long term exposure but the data available indicates acrylic resins have very low toxicity on human beings. It is used medically for [implants](#) in the human body -cranial, [facial](#), dental, orthopedically and more. Many baby clothes are made from acrylic. Fleece today is usually acrylic. Some body care products include it, such as hand lotions. However, almost all paint made with acrylic resins has [solvents](#) and [co-polymers added](#). These are often highly toxic. In addition acrylic is a petrochemical derivative and synthetic mildewcides are often added that contain formaldehyde. Care needs to be taken when selecting acrylic resins that are truly non-toxic.



Sheep produce acrylic in their stomachs and some aquatic plants (algae) produce acrylic naturally. This will never satisfy the massive consumer appetite which at present uses about 7.5 billion pounds per year. Obtaining acrylic in an eco friendly way, that is safe to live with, is an issue Earthpaint Inc believes must be addressed aggressively, since it has a massive global effect.

Acrylic is sometimes made by reusing propylene, a waste product from the manufacture of gasoline. Propylene is heated in steam crackers to produce waste water (reusable), acetic acid and acrylic. Other methods, using propane

and natural gas, can yield enormous amounts of affordable acrylic but this method is better. It uses much less energy and reduces greenhouse emissions from acrylic production significantly. Soon we hope to see corn and sugar technology released that will result in environmentally affordable acrylic resins.

Pure acrylic seems to be one of the better resins for paint but many water based paints do not contain pure acrylic. Instead, they contain lower quality, more toxic varieties of resins. Earthpaint Inc does not use anything except pure acrylic because of environmental and health concerns. Vinyl Polymers, PVA, PVC, Styrene and others either do not perform or have unacceptable environmental reactions. These are often used because they are cheaper than Pure Acrylic.

**In Short:** Pure Acrylic is a good non-toxic resin. Viable alternatives to Acrylic have not been realized yet. Technology exists to make Acrylic using much less energy, resulting in environmentally manageable acrylic. And since even plant oils (linseed, soy) can also be energy intensive to harvest and problematic to use, viable alternatives still need to be developed. Acrylic latex can be made from plants.

**Q:** What are the current Alternatives to Acrylic?

**A:** Natural Soya, Linseed (flax) & Corn.



## Natural Oils and Resins

Soy and linseed resins are plant based resins from soy beans and flax. We prefer to use raw linseed when possible. Soy and linseed can be good trim paints but problematic as wall paints.

As sustainable as they seem caution must still be used with these plant based resins. They often require considerable energy and petrochemicals to make an alkyd resin. Also of concern is the fact that they tend to raise the grain of new drywall. they dry slow, have a vegetable oil odor and can be allergenic. Until these problems are resolved they are not likely to be used widely enough to make a difference for the global environment problems or health issues. They have been common as house paints in the past but people don't use them much anymore since they are perceived as problematic. Soy and linseed seem best suited for

those who are willing sacrifice some convenience for being green.

**Soya Resin** - Alkyd and Polyester Dispersed in Acrylic is available now, sold as soy paint. We haven't seen any that are non-toxic, nor sustainable, yet they are better than full blown toxic paint. This technology has been licensed globally by the company that invented it. It is very lucrative, especially since there is a great deal of soy available. Soy is now very big business. Big business uses the name soy to seem eco friendly. We are not convinced. After sampling many of these dispersions with great scrutiny in our lab we have been unable to justify calling this resin green, non-toxic or sustainable. All of our samples were processed with petrochemistry, high energy and most contained xylene or other unacceptable toxins. The core shell technology of mixing soy with petrochemicals seems to miss the point of sustainability. If you need to add toxins to a non toxic substance in order to call it "green" what is the point? By adding acrylic to a highly processed soya alkyd the paint dries on the surface within a couple hours, then metal driers must be added to dry the soy in a slower manner underneath.

As a wall paint we are concerned with the higher level of driers and solvent required, which can make for a more toxic paint than pure acrylic (which costs more \$\$\$). The production of a water-based soy alkyd usually requires petro chemistry and heat. Soy bean oil alone is totally non-toxic but it does not make good paint. It needs to be converted into an alkyd or polyester. These are both energy intensive processes. They increase toxicity.

There are some promising new technologies for [soybean polyols](#) that we are following. They may result in good wall paints. Since soy beans are an [enormous business](#), substantial funding for soy based resins are available. With some more time this could be a good resin alternative if the drier, solvent and high energy issues can be resolved.

## Could there be more Petrochemistry in Natural Resins than Synthetic? How?

**Q:** Are Bio Resins Really Sustainable?

**A:** Arguably, bio resin has more total petrochemical use than using a pure acrylic.

**Q:** Why?

**A:** Trail of Energy: 12 Steps

1. Fields are plowed with tractors
2. GMO soy/flax is planted with tractors
3. Fertilized, often by products with petro
4. Sprayed with insecticides
5. Harvested with Tractors
6. Sorted with enormous petro-fueled machines
7. Shipped by large Trucks to Factory
8. Oils are solvent extracted or pressed with more enormous machines
9. Oils are filtered, refined raw
10. Shipped to Chemical Companies
11. Heated at high temperatures with petrochemicals to make alkyd resin
12. Shipped to paint manufacturer

..and it's not even home yet! That's a lot of petro-chemistry to make a bio based product! Despite this, Earthpaint Inc supports bio resins in the hope that -eventually- a production process could be developed to be more sustainable and

even beneficial for the earth. **We can definitely make easy-to-use acrylic resin from bio mass. This will take time and the support of an educated public that makes their purchases /votes in favor of sustainably oriented business!**

**Flax Oil - Linseed Oil** - Great stuff. Grows locally. We prefer it to soy since it requires less energy and does not need to be turned into an alkyd to make paint. Although, if you do it can make a petrochemical free alkyd that is very strong, non toxic and sustainable. Linseed is a drying oil naturally. It binds well. Did you ever try to get a dried flax seed off the inside of a blender? Not easy, huh? It has been used for centuries to make strong paint. Dries overnight with minimal driers. Renewable. Beautiful. Many people are used to the strong smelling toxic solvents added to oil based paint. This gave flax or Linseed oil a bad name since it would nearly blow the head off of anyone who put their nose over the can. This is somewhat unfair since it can be made to be very safe. It performs better than acrylic in UV Radiation (sunlight). We use it mostly for wood finishes. All things considered it's the best for wood. Not so great for interior walls. When people put their noses over our wood finishes the only thing they get is hungry!

## Driers

**Driers** can only be added in small quantities for oil-based paints to remain non-toxic. Oil does require driers to cure fast (24 hours). Earthpaint Inc has an excellent drier specialist providing some very good driers that are lead free and are used in small quantities.

We don't usually make oil-based wall paints because they require high levels of driers. This would make them too toxic for our standards. This is because they require more driers and the toxicity is above what can be achieved with a pure acrylic wall paint.



Corn (polylactic acid) is great for plastic packaging but is not yet available as a paint resin for the general public. We are currently following an active study on this resin. It is in use as a paint resin and testing is underway. Since ethanol is being subsidized by the U.S. as a fuel source, large amounts of corn waste may be available for resin production.

As alternatives, Earthpaint Inc makes *true* Clay paints, Earth Paints, Silica paints, Lime paints, Oil-based paints, Plasters and more. These are all great in many ways but all have factors that limit them as viable mainstream alternatives to acrylic. This is a vital point! **It is the mainstream market that must change in order for the planet to be effected beneficially. Products that are not embraced on a large scale will have little effect on Global Warming.** At the same time every single person makes a difference and needs to continue doing so. Especially for the immediate health of the people who are surrounding by paints and finishes.

**The Future of Paint:** Making a pure, bio based acrylic type resin from biomass, corn, sugar beets, wheat and starch-rich materials is the route Earthpaint Inc is encouraging our industrial chemists to pursue. These technologies exist and will come forward soon but they are not supported enough yet in the general public. By supporting Earthpaint Inc you are supporting development of these types of socially responsible resin solutions. We believe significant change will occur by showing large scale manufacturers that *good* paint can be made *non-toxic* and that the people will support this.

## Solvents & VOC

Indoor Air Quality – Paint affects the air we breathe everyday. Important research shows how the emissions from paint continue to contaminate the air in a building over two years later. This is not conjecture there is substantial scientific fact established that what's in our paint can affect our lives. The following is a link to AB1173. It is a very good report full of information on Indoor Air Quality. <http://www.arb.ca.gov/research/indoor/ab1173/finalreport.htm>

[New Jersey's Right to Know Program](#) is a great resource on basic chemical information.

### Don't be fooled by the Zero VOC game

VOC or Volatile Organic Compounds - These are usually the solvents in paint. Not a measure of toxicity. EPA definitions here are broad. [Some dangerous chemicals](#) are exempt from listing as a VOC, (such as acetone a well known toxic solvent in coatings). The [EPA](#) often uses ethane to compare organic compounds to. They do this to decide if a chemical is VOC exempt or not. This is based on whether an organic compound has a negligible reaction in the formation of Ozone. If the reaction is low enough they list it as exempt. These decisions are not based on the health effect of the user but on the overall formation of tropospheric ozone in a reaction with nitrogen oxides (NOx).

EPA regulations on VOC have been good for the environment. VOC emissions from architectural coatings have been one of the largest contributors to **Global Warming** among all consumer products. This is still the case since millions of people buy solvent laden coatings like deck stains, wall paints and polyurethane's. Millions of tons of [Ground level ozone](#) have been created by irresponsible use of toxic petrochemical solvents. Deck Stains, wood finishes, trim enamels, floor paints and polyurethane's can be very high in VOC. Earthpaint considers high to be over 200 g/L but even at lower levels, what matters most is the toxicity to the user and occupants. If it's Zero VOC and full of poison it is probably not worth using.



At the same time a certain amount of non-toxic VOC's aka solvents can be helpful. Very helpful. Solvents keep paint from freezing and help it not to bubble, blister or peel. They are essential for coatings to dry and bond well to surfaces. They make paint flow evenly and to coalesce into a smooth film so it looks good. We often need to use some sort of solvent in coatings. Since solvents can be things that make paint work well this is an area that requires careful consideration.

### What VOC (solvents) should be used?

Water can be used sometimes but this usually results in a low quality paint that doesn't work well. So, again, what should be used?

Non-toxic solvents can be used including citrus distillate, fatty acid esters, methyl esters and propylene glycol. These often do a very good job at making paint that works well. They are the VOC that should be taken into consideration when deciding what paint to use. The term "Zero VOC" has become a marketing tool. There are non-toxic VOC's that do no harm and make a paint that is very good.

**VOC Summary:** VOC is not a measure of toxicity. In a simplified definition VOC is a measure of the amount of material in a can of paint that will evaporate from the dried coating. These emissions can react with nitrogen oxides causing tropospheric ozone (Smog). Zero VOC paints are not always the best performing paints. The most important part to know about VOC is that they should be very low amounts and the solvents should be non-toxic.



**VOC That We Stay away from:** [Ethylene Glycol](#), Benzene, Formaldehyde, Naphtha, Toluene, Xylene, aliphatic hydrocarbons, Propylene Oxide (different than Propylene Glycol which is FDA GRAS rated) Mineral Spirits, [NMP](#), [TEA \(not the drink\)](#), [APES \(not the primates\)](#), [Chemicals and pregnancy Link](#)

Texanol aka. alcohol ester is a common paint solvent. One of the most common. It's added to waterbased paints. It's not a binder or a resin. It can be a coalescent. It is a VOC in the United States. If a paint can label says "solvent free" and contains alcohol ester then it is not solvent free.

Isoaliphatics - Mineral spirits petrochemical disguise words.

Isopar is an Exxon brand name for petro-chemical based isoparaffinic solvents. AKA Mineral Spirits. Earthpaint Inc does not

use nor recommend using mineral spirits. It's simply too toxic. It is 80% cheaper than the non-toxic solvents that we do use. This is why many companies (even some non-toxic ones!) use it in their products. Compared to citrus solvent it is useless. Mineral Spirits is a VOC to eliminate! There are others that need to go (gasoline) but this one does more harm than good in coatings. We see it as cheap, poisonous filler.

Oximes - [Methyl Ethyl Ketoxim \(MEKO\)](#) is a common anti skinning agent. We feel it is dangerous. We wont consider it in our paints. Skinning is not a problem that requires this poison. If a can is left open for a long time a thin skin forms on top. We just easily peel it off, although it's not really an issue for us.

Citrus Distillate aka D-limonene - A powerful solvent that comes from extracted, distilled juice of the citrus fruit. It is a VOC but GRAS and non-toxic. In addition the trees it comes from are beneficial to the air. We use this solvent in very small quantities if a solvent is needed at all. Very compatible with wood. The odor leaves when it dries. It smells like oranges. This is a pleasant odor to most people although some chemically sensitive people react less to a well made non-toxic acrylic.

Propylene Glycol - One of the few [petrochemical solvents](#) that are non-toxic when used in coatings. This powerful solvent holds an [FDA GRAS](#) safe rating as a [food additive](#), however, [Earthpaint Inc would not recommend drinking it](#). If somebody did drink it, it probably would not hurt them. Rats fed 5% in their drinking water did not have developmental / reproductive toxicity.

This is a well [studied chemical](#). 170 millions pounds of propylene glycol were put in human food, cosmetics, personal care products and pharmaceuticals in the year 1999. **The average daily intake from food products in the U.S. has been estimated at 2,400 mg/day.** Published data documenting high blood levels of propylene glycol during continuous therapeutic infusion in pediatric intensive care patients 15 months of age and younger were not associated with any acute toxicity (Crit Care Med 2002; 30: 2752-2756). It seems the only animal that need worry about propylene glycol is the cat, since it responds differently than most other animals.

Despite it's apparently low toxicity, propylene glycol should be used sparingly and respectfully since it is presently mostly derived from petrochemicals (Update: Earthpaint is now phasing out it's petro based propylene glycol. We will soon be using all bio based solvents.) It is very useful in coatings and less allergenic to some people than tree based solvents like citrus (d-limonene). This may be due in part to the fact that it has very little odor. It is a VOC that will evaporate, however, it does more good than harm when used correctly, especially since it doesn't leave poisonous emissions behind when the paint is dried.

There are some good indicators that propylene glycol will not continue to be dependent on petro chemical feedstocks. [It can be produced naturally from sugar and glycerols utilizing specific microorganisms.](#) As global Biomass production increases it is likely that this technology will replace the current production methods of propylene glycol. Earthpaint Inc is constantly working within the industry to get these types of changes made. We will soon be using 100% bio based propylene glycol, when needed.

Ethylene Glycol - Another crude oil by-product derivative. Its parent Ethylene was produced more than any other organic compound, over 75 billion metric tons in 2005. Mostly because it is waste in the manufacture of gasoline.

Ethylene glycol is a very dangerous solvent. It is in most every paint offered at the large-chain home centers and paint stores. Anti-freeze is made with it. It kills dogs who like to drink it because it's sweet. A Dalmatian friend lost her life to it. A paint chemist colleague saw it destroy the life of a coworker who got it into his skin. Most painters don't wear gloves and absorb ethylene glycol into their system.

Ammonia - Exposure to pure anhydrous ammonia gas would be toxic, however, this is unlikely in paint since it is ordinarily used in small amounts in the form of ammonium hydroxide. It is a strong solvent that does more good than harm when used correctly. It is one of the more non-toxic ways to balance pH in paints so they don't degrade in the can.

**Ammonia** is a naturally occurring chemical. The human body and the environment are both very well equipped to deal with ammonia since it is present naturally. It's estimated that the same amount of ammonia manufactured by humans each year is equal to the amount made in nature. You will probably smell ammonia before you are exposed to a concentration that may harm you. Household cleaning supplies and fertilizer usually contain much more ammonia percentages than paint. These should also be used carefully. Chemically sensitive people or those with asthma may need to avoid ammonia.

#### **Things that are not in Earthpaint:**

Earthpaint products do not contain the following substances, according to their formulation:

- ozone depleting halogen hydrocarbons
- organic chloro compounds
- polychlorinated biphenyls/terphenyls
- formaldehyde
- substances with possible hormone like effects:  
alkylphenols, alkylphenol ethoxylates, phthalates

The products do not contain one of the following heavy metals, according to its formulation:

- cadmium - mercury
- chromium - selenium
- arsenic - lead
- antimony - barium

The thresholds of EN 71 Part 3 ( Safety of toys ) and EC directive 94/62/EC (Packaging) are not exceeded.

