

PAINTS AND SOLVENTS

Paints are thin coatings applied to surfaces in a liquid form. They dry and become flexible solids. They have many uses, the protection of the surface from sunlight, dampness, dust, abrasion, and weathering.

They provide easily cleanable surfaces that help keep the substrates clean and tidy. They can alter the interior by the use of color, light or darkness, matt or reflective surfaces and not to forget with texture.

<http://www.color.interiordezine.com/paint/>

Solvent

Solvents are liquids or gases that can dissolve or extract other substances. They are used to dissolve grease, oil, and paint; to thin or mix pigments, paint, glue, [pesticides](#), and epoxy resins; to clean electronics, automotive parts, tools, and engines; and to make other chemicals.

The main purposes of the solvent are to adjust the curing properties and viscosity of the paint. It is volatile and does not become part of the paint film. It also controls flow and application properties, and affects the stability of the paint while in liquid state. Its main function is as the carrier for the non volatile components. In order to spread heavier oils (i.e. linseed) as in oil-based interior housepaint, a thinner oil is required. These volatile substances impart their properties temporarily—once the solvent has evaporated or disintegrated, the remaining paint is fixed to the surface.

This component is optional: some paints have no diluent.

Water is the main diluent for water-borne paints, even the co-solvent types.

Solvent-borne, also called oil-based, paints can have various combinations of solvents as the diluent, including aliphatics, aromatics, alcohols, ketones and white spirit. These include organic solvents such as petroleum distillate, esters, glycol ethers, and the like. Sometimes volatile low-molecular weight synthetic resins also serve as diluents. Such solvents are used when water resistance, grease resistance, or similar properties are desired.

http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=28

TYPES OF PAINT AND SOLVENT

Oxygenated solvents include such products as [ketones](#), glycol ethers, and alcohols. These types of solvents are created by extracting elements from other chemicals to come up with the desired consistency and balance of components. Generally, oxygenated solvents have a very high rate of purity, as the product is refined in the final stages of production. Minute particles and even excess water is extracted before the solvent is considered complete and ready for use.

Hydrocarbon solvents include aromatic and aliphatic [hydrocarbons](#) that make them ideal for use in a number of household products. These types of solvents are somewhat more complex in composition than the simple oxygenated solvents. Hydrocarbon solvents tend to be distilled to suit an intended purpose. This means the composition of the solute, color, and smell of the final product will vary greatly, depending on the purpose for the final product.

Halogenated solvents are actually hydrocarbon solvents that have undergone a chlorinating process. This means these types of solvents will possess many of the same qualities. The amount of liquid that dissolves is usually a little different, and the halogenated solvents may have a more pungent aroma than the gentler hydrocarbon solvents.

<http://www.wisegeek.com/what-are-the-different-types-of-solvents.htm>

PRIMERS

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SEALERS:

These coatings are designed to provide the surface for the finish coats of paint or clear finishes.

Primers seal the surface off and provide a "tooth" for the finish paint, they are used on bare wood and metal, previously painted surfaces that have been repaired or are in poor condition, (flaking, peeling), or if the existing surface is to be painted with a new color that is much darker or lighter than the existing. Primers/Sealers are also used block out stains like water stains, crayon, smoke, soot, ink and on woods that will bleed through a paint coating, e.g., cedar or redwood.

Primers/Sealers insure longer lasting paint work as the resins in the finish paints stay on the surface creating the "wear layer" as they are designed to do. Peeling and premature failure is eliminated and this is by far the most important part in getting a long lasting, durable finish.

FINISH

PAINTS:

There are two types of paints used today, latex and alkyd. Alkyd paint is also known as oil-based paint. Latex provides an excellent finish, while being an easier paint to use. Latex paint cleans up with soap and water, dries quickly, has less odor, is non-flammable, easy to touch up, they remain more flexible and allow moisture to evaporate through the film thus reducing blistering,

cracking and peeling. Inexpensive latex paints use softer vinyl resins (binders) and more water in the formulation while the more durable of the latex paints use 100% acrylic resins and less water, (you only get what you pay for). The term "Enamel" is normally associated with paints that have some gloss to the finish. Enamels are formulated with higher concentrations of resin as they are intended to be subjected to more wear and tear. Hy-Tech ceramics enable Hy-Tech to produce flat finish paints that have the same durability as shiny traditional "enamel paints.

LEVELS of GLOSS:

The sheen of a paint is the amount of light reflected by the surface of a paint finish. There are four basic sheens: flat, satin, semi gloss and gloss. **Flat Paints** exhibit non-reflective properties providing a matte finish. This finish helps hide surface imperfections, and is normally used for ceilings and walls in areas not subjected to a lot of wear and tear, dining rooms, living rooms and bedrooms not used by small children. **Satin Finish** also know as eggshell finish, provides a soft luster sheen similar to that of an eggshell. A satin finish provides a harder surface finish which is more durable and more stain resistant than a flat finish. This durability makes satin paint a good choice for walls in children's rooms, hallways, stairways and family rooms. **Semi gloss Paints** are very durable, they are easier to clean, and are more stain resistant than satin finish paints. Semi gloss paints are most often used on heavy wear surfaces or areas that are frequently cleaned such as kitchens and bathrooms. Semi gloss paint is also used on wood trim and cabinets. **Gloss Paint** is a harder, more durable, more stain resistant paint finish. It is easier to clean than all the other paint finishes. Gloss finishes generally make surface imperfections more noticeable. Gloss finishes are the best choice for heavy wear areas like kitchens, bathrooms, furniture and cabinets, floors, stairs, handrails, high traffic doors and trim.

http://www.hytechsales.com/howtopaint/paint_types.html

PAINT IS COMPOSED OF FOUR BASIC TYPES OF MATERIALS:

- **Solvent** -- The liquid that carries the solid components of paint. It must be present to allow the paint to be of correct consistency for application by brush, roller, spray or dipping. The most common solvents used in architectural paints are water and organic solvents.
- **Binder** -- The binder or resin is one of the most important components of paint. It is the basic solid film former that remains after the solvent has evaporated and which binds the pigment particles together into a cohesive paint film.
- **Pigment** -- This is the component that gives paint its other most important properties of color and opacity. The pigments used in paint are normally present as fine solid particles that are dispersed, but not soluble, in the binder and solvent.

- **Additives** -- Additives are the specialist components of paint. They are used in small quantities to improve production and storage properties of the liquid paint product as well as application and other performance properties of the paint film (e.g., anti-marring agents, anti-mold agents).

<http://www.hercenter.org/facilitiesandgrounds/paints.cfm>

Watercolors are cheap so easy to explore. They are thin transparent paints usually painted on paper. The paint is somewhat difficult to use because the paint changes form as it dries. Most children can start **finger painting** with watercolors because they are easy to wash off your hands and clothes. But even finger painting can be very prestigious as **3-year-old Zach the genius** who has over 1 million hits on [youtube](#) of him painting a **Teenage Mutant Ninja Turtle**.

Acrylics are good for **beginners**. They are easy to work with because they're thicker than watercolor paints. Because they are thick, they are easy to blend with other colors and easy to control when painting them on a canvas. **Acrylics** dry quickly and turn into plastic, so if you make a mistake it is easy to wait a few minutes for it to dry and then paint right overtop of the mistake. But be careful, and keep the paint wet or it could be tough to use and clean up.

Oils are the thickest paints and easiest to control. They take days to dry so you can work with the paint for hours to get the images you want. Once applied to a canvas, you can work in other colors easily, change the **form and textures**, all over long periods of time. If you make a mistake, you can scrape of an entire layer of paint without damaging the layers underneath. The **disadvantage** of oils is that they are more expensive and more materials are needed to work with them. They are also messy and you cannot use water to clean them up... you need some sort of turpentine

<http://www.kidzworld.com/article/23736-the-different-types-of-paint>

USES OF PAINT AND SOLVENT

Some commonly used solvents are:

SUBSTANCE	USED FOR
Acetone	industrial coating
Trichloro ethylene	degreasing

Toluene	industrial coating, manufacture
Methylene chloride	paint removal
Methyl ethyl ketone (MEK)	printing ink
Perchloro ethylene	dry cleaning
White spirit	

<http://www.workershealth.com.au/facts051.html>

HOW SHOULD PAINT AND SOLVENT BE STORED AND TRANSPORTED

STORAGE AND TRANSPORT

- Paints and solvents are stored in approved containers and areas. [1930]
- Containers are kept closed when not in use. [1935(a)]
- Only closed containers are used for transport or storage. [5417(e)]
- Incompatible chemical products (which may cause a hazardous reaction if they come in contact) are not stored together. [1549(g) and 1931(b)]
- Smoking is prohibited in flammable liquid storage areas. [5543(c)]
- Flammable liquids are not stored near sources of ignition (sparks, electricity, flames, or hot objects). [1534(b) and 5543(c)]
- Where more than 25 gallons of flammable liquids are present in small containers, they are kept in a storage cabinet approved by the National Fire Protection Association (NFPA). [1930(a)(4)]
- Indoor storage areas for flammable liquids are ventilated and have one clear aisle, at least three feet wide. [1931(e) and (f)]
- Flammable liquids stored outdoors are at least 50 feet from the property line and 10 feet from any public way. [1932(a)]
- Outdoor storage areas are graded to divert possible spills away from buildings. [1932(b)]
- No flammable liquids are carried with explosives in vehicle cargo space. [1564(j)]

<http://www.elcosh.org/en/document/237/d000239/paints-%2526-solvents-checklist.html>

DISPOSAL METHODS FOR PAINT AND SOLVENTS

CLEANUP AND DISPOSAL

- Appropriate cleanup materials are available for leaks or spills. [1935(b) and 5192]
- Leftover products and waste are properly stored, labeled, and disposed of according to the instructions on the product's MSDS. [1930 and 5192]

- Workers do not use solvents to clean hands or clothes. [5155 and 5194]
- Flammable liquids are not used to wash floors, walls, ceilings, structural members, furniture, equipment, machines, or machine parts unless ventilation is provided. [5417(b) and (d)]
- Flammable liquids are not sprayed for cleaning purposes, unless used (1) in a ventilated spray booth, or (2) outdoors in an open shed with no ignition source within 25 feet. [5417

<http://www.elcosh.org/en/document/237/d000239/paints-%2526-solvents-checklist.html>

When disposing of latex based paint, you need to either let the paint dry out by removing the lid and letting them sit for awhile, or put in an additive to make it into a solid by mixing it with a material such as kitty litter or sawdust. Once you've let it dry out or turned your latex paint into a solid you can put it in your recycling but this really depends on where you are located and your local paint disposal guidelines.

When dealing with oil / alkyd based paint the paint disposal methods are different, with a much higher VOC content and typically carrying flammable properties much greater care must be taken with this type of paint disposal. The ideal method of alkyd/oil paint disposal will be set out by your local municipality but typically it must be disposed of at a special hazardous waste management center or your local recycling center. Never throw this stuff out in the garbage or pour it anywhere, there is a reason alkyd based paint is being phased out as it really is quite terrible for our environment and there are a lot of alternatives now that can replace the usage of these paints.

<http://www.painterforhire.ca/paint-disposal>

ENVIRONMENTAL RISKS

Environmental impacts and risks

By far, the most important environmental impact from paints and coatings is the release of volatile organic compounds during the drying process after the coating is applied. Virtually everything but the solids in a typical coating formulation is released to the air around the surface being coated. In an enclosed system, such as a paint booth, some of this emission may be captured before release to the atmosphere. Otherwise, it adds to the general atmospheric loading.

Most organics in the atmosphere have a relatively short life. Sunlight is particularly effective at bringing about the oxidation of VOCs, ultimately to carbon dioxide. But it can have some consequences on the way. In the presence of nitrogen oxides (such as are produced by combustion from such sources as vehicles and power plants), photochemically induced VOC

oxidation produces ozone as a by-product. Ozone, a highly reactive form of oxygen, is a health risk at very low concentrations, and is the ultimate risk factor associated with VOC emissions.

Other impacts arise from the presence of toxic solid materials in the paint formulations. In contrast to the immediate effects of VOCs, solids persist, and can create problems long after the coating is applied. The legacy issue of lead, as mentioned above, has moved primarily out of the painting and coating arena, since lead was phased out of most paints a generation ago. However, some specialized coatings still contain problem materials. In some cases, it has proved very difficult to find substitute materials with adequate performance characteristics. Examples include the use of chromium for tough protective coating of steel (as in engine parts treated by hard chrome electroplating), and for corrosion protection of aluminum, zinc, and other light metals (conversion coating of high strength copper-bearing aluminum alloys used in aircraft presenting a particularly difficult substitution problem). The use of cadmium on fasteners used in the aircraft industry is another example. The problem becomes particularly acute when international consequences are taken into account. For example, rainwater or wash water coming from airplane surfaces can create a situation where the level of chromium or cadmium in surface runoff can exceed stringent water quality standards in some European countries, and aircraft with coatings containing those metals might at some point be prohibited from using certain European airports.

Issues list

Air quality

- VOCs from paint solvents released on drying
- VOCs from paint stripping operations

Water quality

- Solvents contained in water from wet scrubbers
- Runoff from vehicles, ships, and aircraft bearing protective coatings with toxic metals

Waste disposal

- Sludges from overspray collected in scrubbers
- Landfilling of paint containers with leftover contents
- Solid waste with painted surfaces containing toxic metals

<http://ecm.ncms.org/ERI/new/IRRpaintcoating.htm>

Once in the atmosphere, VOCs participate in the formation of ozone. In the presence of nitrogen oxides (NO_x) and sunlight, VOCs react with oxygen in the air to produce ozone, the

most toxic component of the form of pollution commonly known as smog. Ozone attacks lung tissue, and is very injurious, even in very low concentrations. To prevent the formation excessive levels of ozone, the VOC content of paint, and its conditions of use are subject to regulation by federal, state, and local environmental agencies.

<http://www.hercenter.org/facilitiesandgrounds/paints.cfm>

See also: http://www.doe.gov.bz/documents/services/ECP_Automotive_Spray.pdf