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Graham Training Letter

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What is Paint?

Paint has been around for a long time. Caves in France have been found with brilliant paintings of animals that have been dated to be over 15,000 years old! Ancient Egypt tombs have brightly colored paintings adoring the walls that are thousands of years old. Paint has been used for thousands of years to decorate and protect all kinds of objects. Just look around you, no matter where you are, and you will see a lot of paint on many of the objects and things you use everyday.

Protection and decoration are paint's two uses. Paint's ability to protect objects is really a tremendous asset. Just imagine if automobiles weren't painted; we all would by driving around heaps of rust until they literally rusted apart in a few months. Incidentally, automobile paint is just about the highest quality paint made.

Perhaps you've seen a wooden barn that had been painted with an advertisement years ago. The wood has weathered and eroded so the painted portion was protected and is raised above the eroded wood like the painted wood had been routed. **There aren't many things in the world that provides the value that paint does at such a reasonable price**. From protection valuable assets like automobiles, ships, bridges, etc., to providing fashion in one's own home, paint is a staple necessary for everyday living.

What are the ingredients in Paint?

Paint, both latex and oil-based paint, is made up of three basic components: Binders (resin), pigments and solvents.

Binders are resins that form a continuous film that adheres to the substrate and binds the pigment. It is the backbone of all coatings.

Pigments principal task is to provide opacity and color. They also provide bulk.

Solvents make the paint workable so it can be applied easily. Paint without solvents would be too viscous to be useful.

There are other ingredients in paint but these are the main three.

Binders

Binders for latex paints are primarily vinyl acrylic and acrylic latex resins. Other latex resins include vinyl acetate, styrene butadiene and urethane. Acrylic resins are very durable and provide good exterior resistance to the harmful UV rays of the sun and from the effects of snow and rain. Acrylic resins provide good adhesion to most substrates.

Vinyl acrylic resins do a good job for interior applications. In general, they are a less robust resin than acrylics, and do not have the wash ability or scrub resistance.

Vinyl acetate resins are generally used in primers because they have very good adhesion. They are less robust than vinyl acrylic. (Elmer's Glue is made from vinyl acetate.)

What are the ingredients in Paint? - Binders

Styrene Butadiene resins are principally used in moisture vapor barrier primers. Urethane and Urethane/acrylic latex resins are used in clear finishes and some paints. They are very hard and durable. Epoxy and acrylic/epoxy resins are used in heavy-duty two part systems.

Binders for oil-based paints and varnishes are alkyd resins, urethane modified alkyds, urethane modified oils, linseed oil, tung oil, epoxy and spar varnishes. The most common types of porch and floor enamel, industrial maintenance enamel and general-purpose enamels use polyurethane modified alkyds, alkyds and quick-dry alkyds as their binders or vehicles (the term vehicle is used interchangeably with binder. The vehicle "carries" the pigment). Oil-based paints and varnishes continue to harden as they age and become after year after year.

World's first washable flat finish & still the best

How do paints dry?

If you look at a latex resin under a microscope, you will see that the resin is made up of tiny round balls called micelles. These micelles hold the resin. The liquid surrounding the micelles is water and a coalescing solvent. When the paint is applied, the water evaporates. The coalescing solvent dissolves the micelle and the micelles flow together forming a continuous film.

Factors influencing the length it takes latex paint to dry are relative humidity and air movement. The lower the relative humidity and the faster the air movement, the faster the dry.

The solvents in oil-based paints evaporate first. The oxygen in air then chemically promotes the oil in the resin to react with other oil molecules into becoming larger and larger molecules. As the molecules become bigger, the film becomes harder.

Temperature and air movement are the factors that influence dry in oil-based paints. Relative humidity is not a big factor.

Drying of latex films is largely a physical phenomenon. Oil-based paint drying is a chemical reaction.

Modern water borne coatings are the best you can offer to your customers

Pigments

The basic white pigment found in many paints is titanium dioxide. It has a high refractive index. A high refractive index is what makes things opaque. Refractive index is the measure of how much light bends when going from one medium to another such as from air to titanium dioxide. Titanium dioxide is used in all white paints and all bases except the neutral or clear base. It is also used in conjunction with colored pigments in colored paint to improve the hide.

Various other pigments such as clay, talc, mica, silica, calcium carbonate, quartz, etc. are used as fillers, to space the titanium dioxide particles properly to achieve the best hide, to promote good sand-ability, to prevent settling, to prevent mud-cracking, and many other properties.

Ceramic microspheres are used to replace part of the conventional paint pigments. Ceramic microspheres are tiny round spherical particles that are very hard and impervious to just about everything. They act like ball bearings and make application a breeze.

Solvents

Water is the solvent in latex paints. Latex paints usually, but not always, contain a co-solvent or coalescing solvent as well, which aids in the film coalescing.

Oil-based paints usually contain a **hydrocarbon solvent** such as mineral spirits. Paints formulated for brush and roller application use slow-evaporating solvents such as mineral spirits whilst paints formulated for spray application usually use faster-evaporating solvents such as VM & P naphtha.

Although much science goes into paint making, much of it is still an art

Other ingredients

. In order for paint to be useful, the pigments must be dispersed or ground into the binder. Pigment is packaged in a form where the individual particles are agglomerated together. Considerable mechanical energy must be spent to separate the particles. **Dispersant**s, a form of surfactant, are used to make the dispersion of pigments go smoothly.

Bacteria and mold will eat any organic material. **DEFINITION:** Organic material is defined as anything that contains carbon. Much of paint is organic. It needs to be protected from the harmful effects of mold and bacteria while the paint is in the can. When bacteria attacks paint, the viscosity drops dramatically and there is a very foul odor like spoiled milk. Anti-microbiological agents such as bactericides and mildewicides are added to protect the paint in the can.

Thickening agents are used to obtain a viscosity that makes it easy to apply.

Flow agents may be used to help provide good flow and leveling.

Surfactants are used to provide good compatibility between colorants and the paint.

All latex resins want to foam because of the surfactants in the resins (used in resin manufacture to help make the micelles). Anti foaming agents are used to control the foam.

Anti-settling agents maybe be used to help prevent the pigments from settling hard in the can.

Glycols may be added to provide freeze-thaw protection.

Driers are used in oil-based products to promote and speed up dry.

Anti-skinning agents are used in oil-based products to prevent skinning in the can.

Agents that control the pH (pH is a measure of the acidity or alkalinity of substances. 0 is very acidic and 14 is very alkaline.) Paints are almost always alkaline in the 8-9 range. Can linings are made up of mostly epoxy and epoxy is very resistance to alkaline but fails when exposed to acidic conditions that will cause the can to rust.

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Why Graham products are better

Graham Aqua Borne Ceramic products use a particular type of 100% acrylic resins called a fine particle size acrylic emulsion or as they are commonly referred to as water borne resins. If you look at a regular acrylic latex under a microscope, you will see the micelles which are spherical shaped. For comparison purposes, they would appear to be the size of basketballs. If you examine a fine particle size acrylic emulsion under the microscope the little balls would appear to be the size of ping pong balls. You can imagine the far greater points of contact the peas would have in a barrel than the basketball sized particles. This is how water borne paints have such great adhesion to most all substrates.

The use of ceramic microspheres greatly improves the performance of the paint. The microspheres are very hard and impervious to dirt pick up. Even the flat paint will scrub over 2000 cycles. The ceramic surface facilitate washing making it easy to remove dirt and stains.

Application is made very easy because the spheres act as little ball bearings making the paint just glide on.

Conventional paint pigments have sharp peaks which can break off causing marring. They also have deep valleys that collect and hold dirt. The ceramic microspheres are round, smooth and hard so marring and dirt pick up are improved.

On exterior exposure conventional pigments tend to whiten and cause a chalky look to the coatings. Ceramic microspheres hold up much better to the harsh UV light of the sun and the paint color remains bright much longer.