Maximum Sustainability

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Sustainability is the seed of paint and coating industry. The sole purpose of paints is to provide sustainable development. To provide durability and protection, prolong life cycle of the object and enhancing its appearance. The contribution of the paint industry towards global sustainable development is enormous. The coatings protect ships from marine salts, algae and pressures in oceans; the climatic extreme on the aircraft: durable infrastructure on the ground and below. Liquid engineering by the way of oxidization and adhesion is the prime objective of the coating. Protecting the object for a longer time, is its sustainable objective. This property of increasing the life causes savings in several million manhours, energy and environmental resources.

Within this sustainable industry also we need to prioritize best use and optimization of resources. Reduction of waste on the paint manufacturing floor is a discussion of maximum sustainability.

Reuse of total paint items is Regent Paints' revolutionary best step forward in sustainability towards the industry.

With several options available manufacturers can get rid of the waste.
The dependency on a secondary vendor or recycler is currently inevitable, so is the generation of waste.
Prime responsibility lies with the factory.
Hence solution is possible from the point of generation.
By creation of coating product from the waste streams, within the facility of the generator Regent Paints can not only eliminate a lot of waste but provide savings in the raw material imports or extractions of natural resources. Producing the basic resin and base type intermediate and final items that is in further reusable state. Transformation of waste to usable products is required in cases with items that have been damaged chemically and has chances of some recoverable properties.

Due to revolutionary formulations and products created by Regent Paints, several million pounds of materials are kept away from waste disposal. This results as lesser waste in the factories along with economical reuse solutions.
Items moved under this partnership are moving as a product and no longer as waste (hence that, much lesser waste generation).
Regent Paints is seeking best environmental solutions on recycling the paint related waste. It is now reutilizing paints and raw materials into best sustainable way possible.

Workings

The companies cooperate with Regent Paints Inc. for its technical and reprocessing capabilities, utilizing their plants in several locations to find environmentally best solution. They can create, classify and use paint waste as a product to be used in paint batches.
These companies have incorporated the system of reusing the waste, raw materials, wash streams, expired products, mis-tint, batches gone wrong, discontinued lines, closeouts and all kinds of off specs. They can now create items from the factory locations, stores, warehouses or third-party customers to produce instead of waste.
This can now move as a product by virtue of its capability to change its form, properties, chemical composition in sync to required batch properties. End Use Certificate and Undertaking is provided by the reuse facility.
The companies take a list of obsolete or unsalable items along with basic details to categorize them. These items will not be categorized as waste any longer.

They crush cans and protect the brands in the events of mis-tint and discontinued or expired finished products.
Solvent based paints like alkyd enamels, stains, solvent based ink products, primers, paint thinners, tank washed solvents, alkyd resins, epoxies, hardeners, etc. are now a part of the reusable paint family. Mr. Huzaifa Matawala (Regent Paints) has patents pending with USPTO for several formulations and processes on Oil paint Recycling.

Patent products, research and processes

With a vision to initiate a process of oil paints reuse and recycling.
The Regent Paints' patents cover a total program of recreating a product form the solvent based items like it does latex recycling. It checks the ingredients details and the chains that resins have formed due to the reactions.
The study of the binders and resins in the paint is essential to determine the final batch consequence.

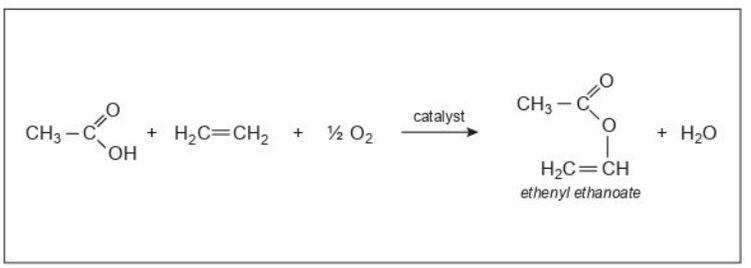
Water-based paints

For water-based paints the process is simply just:
- Colour-wise sorting
- Bulking
- Filtering
- Blending
- Packing.

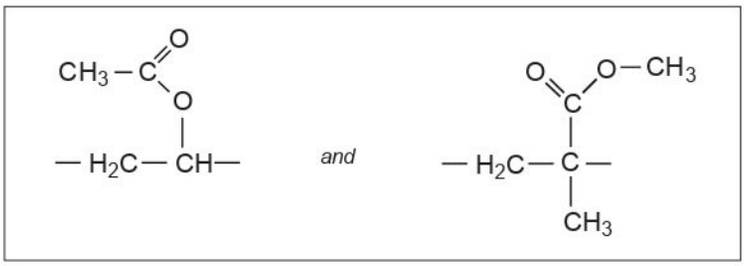
Binders in paints

The three most important binders (resins) used in modern paints are:
- acrylic polymers (resins)
- alkyd polymers (resins)
- epoxy polymers (resins)

The binder in many emulsion paints is based on homopolymers or co-polymers of ethenyl ethanoate (vinyl acetate) and a propenoate (acrylic) ester.
Ethenyl ethanoate is manufactured by passing a mixture of ethanoic acid vapour, ethene and oxygen over heated palladium(II) and copper(II) chlorides:



Ethenyl ethanoate and an acrylic ester (for example, methyl 2-methylpropenoate) are then co-polymerized to form a random array, in which these groups link into a linear chain:



Other acrylic esters used as co-monomers with ethenyl ethanoate are ethyl propenoate, butyl propenoates, or a co-polymer of butyl propenoate and methyl 2-methylpropenoate.

Emulsion paints are so-called as they are made by a process known as emulsion polymerization, in which the liquid monomers to be polymerized are first dispersed in water, as an emulsion. The polymers produced by this process typically have relative molecular masses of 500.000 – 1.000.000. As such they are useful only as dispersions since they would be extremely viscous if they were carried in solution and this would make them unusable (**Fig. 1**).
Acrylic resins may also be used in industrial paints, either as water-borne emulsion paints or as solvent-borne paints. Solvent-borne industrial paints can have a tough protective finish and are widely used in industry as topcoats, for example on car bodies. The paint frequently comes as two components

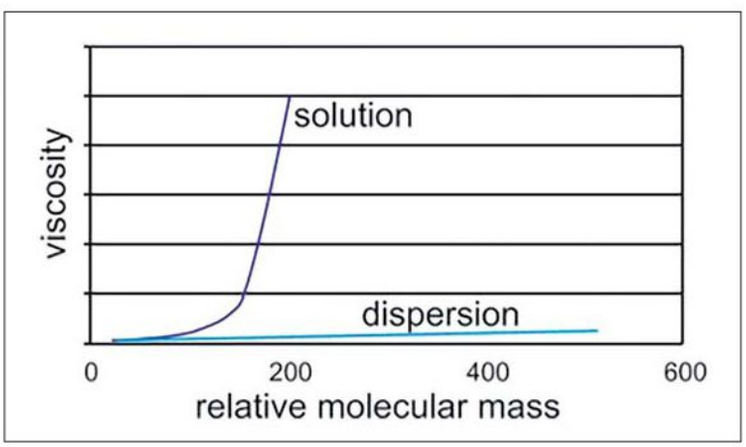
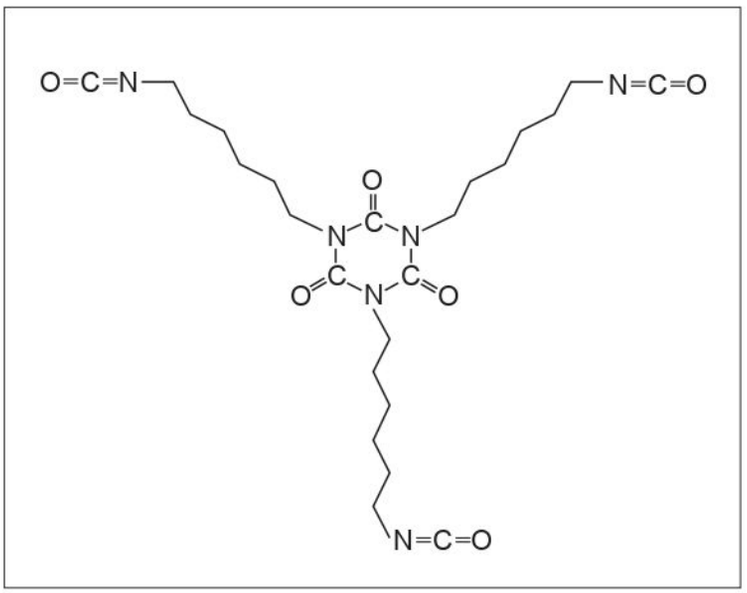
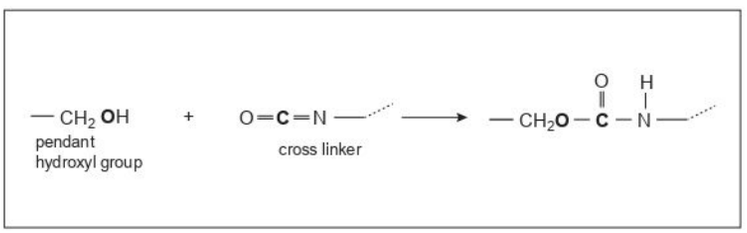


Figure 1: Graph showing relationship between relative molecular mass and viscosity for solution and dispersion polymers.

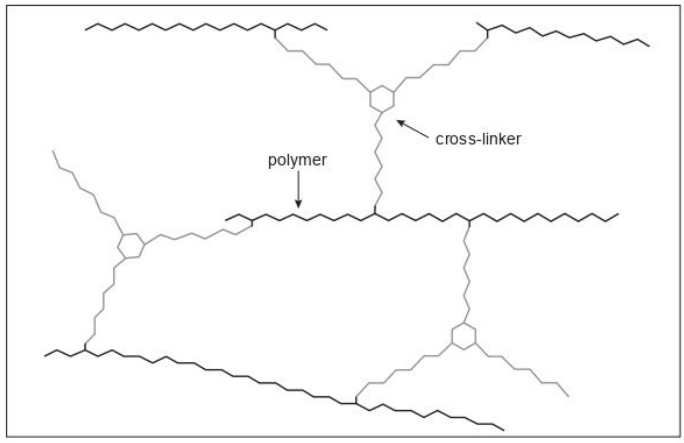
which are mixed together just before use: the main paint portion typically consists of an acrylic resin produced by the polymerization of a propenoate ester formed from a polyhydric alcohol (diols and triols). The resulting polyester has numerous hydroxyl groups (-OH) pendant from the polymer backbone. The hydroxyl groups react with the other compound often consisting of a polymeric isocyanate such as a trimer of 1,6-diisocyanatohexane (hexamethylene diisocyanate):



Such a compound is known as a crosslinker for it produces, on reaction with the resin, a three-dimensional structure similar to the polyurethane formed from a polyol and an isocyanate.
When these two components are mixed together, a chemical reaction takes place between the hydroxyl groups on the polymer (acrylic resin) and the isocyanate groups on the cross linker:



This reaction proceeds relatively slowly at room temperature, allowing enough time for the paint to be applied, after which the solvent thinner evaporates and the painted item is placed in an oven to accelerate the chemical reaction. This greatly increases the molecular mass of the polymer causing it to become a three-dimensional molecule and form a hard film, resistant to chemicals:



Solvent-based paints

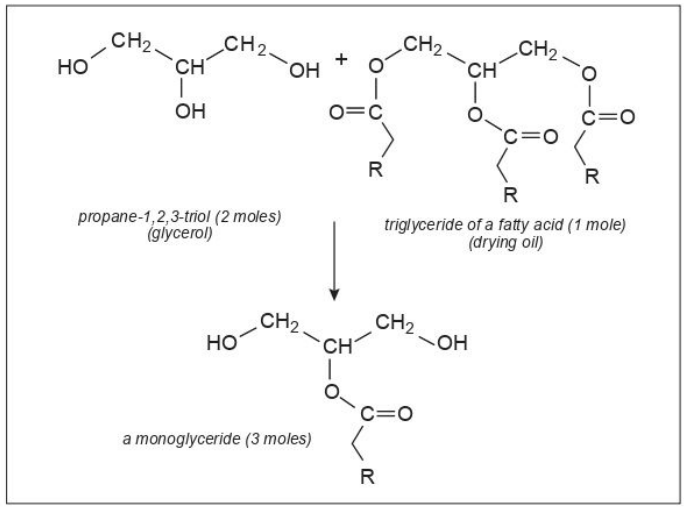
For solvent-based paints Regent Paints has extra processes as every batch is special and the products are more diverse in properties. It classifies them on the basis of the resins.

Alkyd polymers (resins)

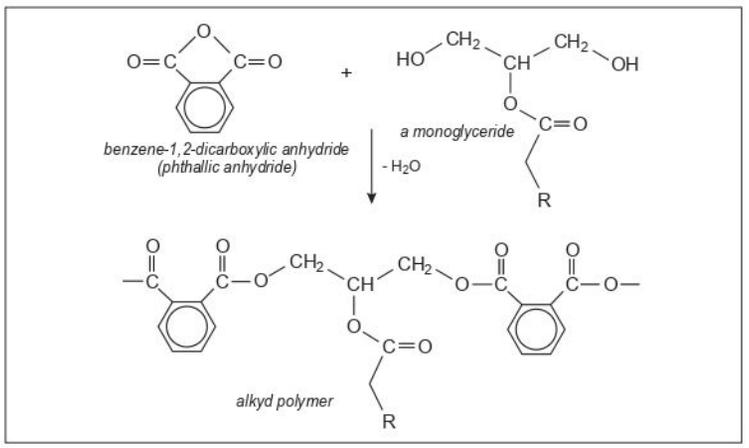
Decorative gloss paints typically contain alkyd polymers (resins). A typical resin is that produced from a polyol such as propane-1,2,3-triol (glycerol) with a dibasic acid such as benzene-1,2-dicarboxylic (phthalic) anhydride and a drying oil (linseed or soybean oil). On being heated together, ester linkages are formed, and water is a by-product. The name alkyd is derived from alcohol and anhydride.

The first step in making the alkyd polymer is the reaction between the triol and the drying oil to produce a monoglyceride.

For example:



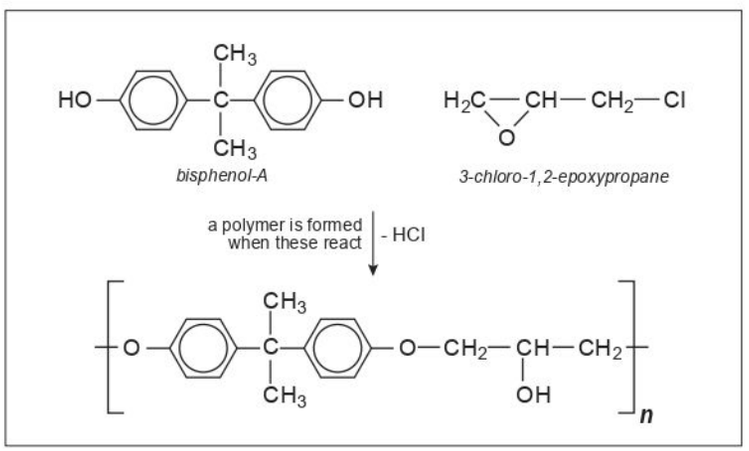
The monoglyceride then reacts with the anhydride to form the alkyd polymer (resin):



The alkyd resins, which generally have relative molecular masses in the range of 10.000 – 50.000, are usually carried in organic solvents (solvent-borne paints). Turpentine extracted from trees was used in the past as the solvent, but this has been replaced by solvents from petrochemical feedstock, such as 'white spirit' which is a mixture of aliphatic and alicyclic hydrocarbons.
Once the alkyd resin is applied, the pendant oil drying groups react with oxygen in the air to form a cross-linked, hard thermoset coating, with a high molecular mass.

Epoxy polymers (resins)

Epoxy resins are often used as the binder in industrial coatings (primers). They give the paint excellent adhesion together with high resistance to chemicals (corrosion), and physical resistance necessary, for example, on ships and chemical storage tanks.
The epoxy resins are made from 1-chloro-2,3-epoxypropane (produced from 3-chloropropene) and substituted phenols, such as bisphenol A:



The value of n can be controlled to give a range of resins varying from viscous liquids to solids with high melting points. Epoxy resins can be carried in solvents such as aromatic hydrocarbons, alcohols, ketones and esters (solvent-borne paints) or as dispersions in water (water-borne paints) as true emulsions. They are not normally used in topcoats for outdoors because they are susceptible to UV degradation, but they make excellent interior coatings and exterior primers.
Epoxy resins are also used as adhesives (e.g. Araldite) and electrical insulators.

Stages involve initial sorting on the basis of:

A) All kinds of decorative enamels/epoxies/ polyurethane and industrial coatings and primers. Before Regent Paints finalizes a contract it asks for TDS, specs, or sample report, or visit in personal. The company always has an idea of what is collected. Most of the items are mineral spirits based. Most general resin is soya based, long/ medium oil.

B) Compatibility with other matt and gloss paints. Regent Paints uses glossmeter and density checks to ascertain the resin content and strength of the item received. There are variations in every barrel it receives. But the final product is primer of matt/ eggshell finish or bitumen item. The final product performance is not very demanding. It is a basic economic coating for walls, metals or wood.

C) Density and Ingredient check. After the above steps Regent Paints ascertains the product mixing in batches of patented primers and coatings. It has to be careful in this. If it mixes 1 wrong can the entire batch gets gelled.

Regent Paints creates final products that are used in the market for its local buyers. Hereby it creates more value-able products with experience and judgement on the recycling. The use of these coatings is minimal in the developed countries, but can serve as a major help in the economies that need infrastructural development. The infrastructural zones of the developing countries can be served with the durable healthy products, that are created from the solvents and oil paints. Regent Paints has markets who use these items as an economical coating.

SUSTAINABILITY

The company produces bitumen paints and several coatings that use lower end resins and solvents in formulations. Such primers serve as an undercoat. It has replaced bitumen coat formulations with these recycled paints.
It has also formulated several primers for wood and metals. The salty humid and dry extreme climates require a coat that protects the surface, prevents the erosion on walls and keeps the structure stand for longer. Regent Paints has listed technical data sheets with the ministry of Kuwait with the element of alkyds and its CAS details as a part of the new changed formulation. These products have been tested on the market and have been approved as they passed the requirements and functions, with a vision to initiate a process to recognize the fact that oil paints have several important ingredients that are better utilized as paints.
The resins, when cooked in a reactor with the amines and phtalic anhydrides or penta or metallic or monomers, are the composites achieved with several variations of mixes of temperatures and petrochemical fusions.

Hence the energy, resources, power and rare blends of nature and technology shouldn't be wasted without a study. If Regent Paints is able to sustain the pulp of these and be able to re-utilize them as a pulp in blending paints in the future, it is on a better path of serving the environment.
It is far more environmentally appropriate to re-utilize oil paints and paint related items so we can save the process of raw material generation. Such generation of raw material process is far more environmentally stressful.
And re-utilization of the oil paint saves on natural resources. Solvent based paints like alkyd enamels, stains, solvent based ink products, primers, paint thinners, tank washed solvents, alkyd resins, epoxies, hardeners, etc. can reach a solution of reutilization. Savings on costs, ingredients and environment.
We can recycle, classify, rectify, and re-utilize in a very cost-efficient manner.