



Is there plastic in paint?

And if so, could you leave it out?

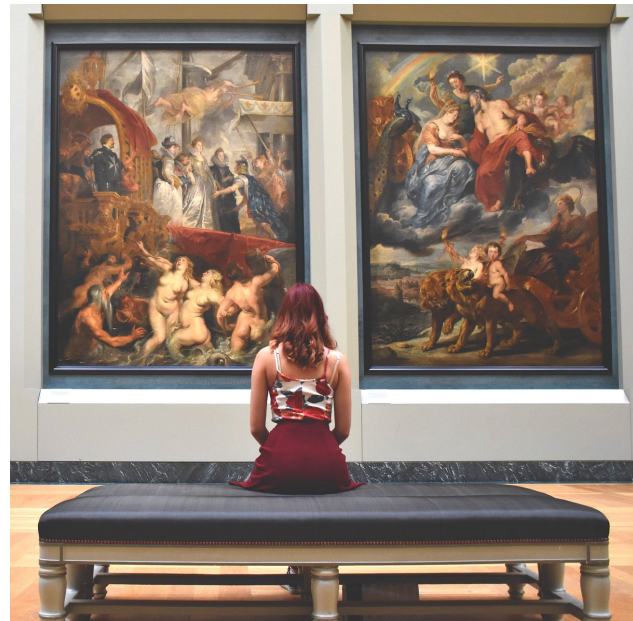
Information bulletin

Why paints last

Ever wondered why we can still admire paintings that artists made over 500 years ago? What made them last so long? Why do they not crumble from the canvas?

The artists of those days knew that in order to hold the colours together they needed oils to mix the pigments in and to make their paints stick to the canvas. Most times linseed oil was used. And although the word 'polymer' did not belong to their vocabulary at that time it was exactly that what was formed when these oils dried over several days or weeks. These oils were also known as 'binders' while they held the pigments together.

The paints we use today to beautify or protect our houses, yachts, cars, planes etc. still need this binding function. For reasons of quality and workability (e.g. speed of drying) we no longer use these unmodified oils. Chemistry has offered us polymers that fulfill a lot of the demands of modern day's customers.



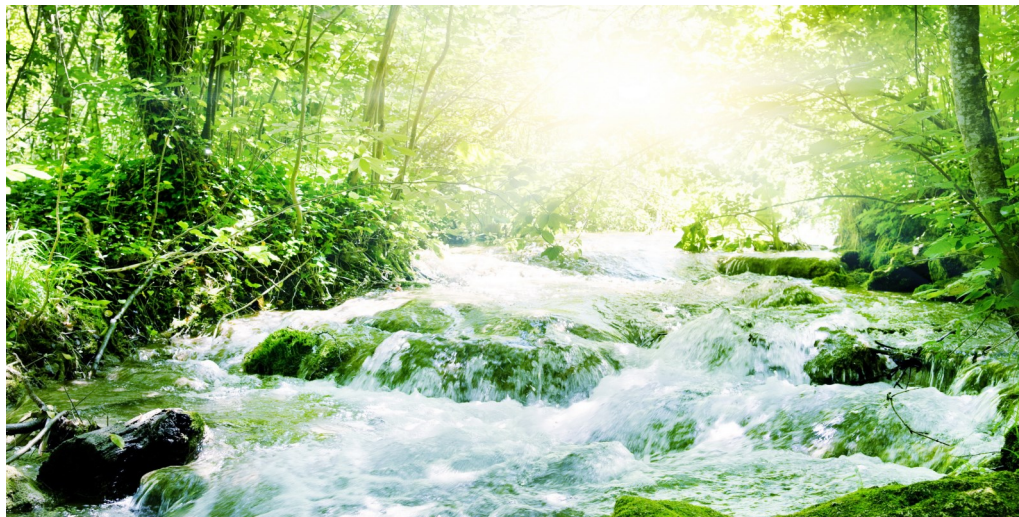
Protecting your window frames at home or huge bridges or energy windmills paint has a great societal value. It extends the lifetime of these objects and so contributes to a sustainable society. A thin paint-layer with a small footprint extends the life of the underlying substrate that has a lot larger embedded footprint.

Over the last decades paints have been improved to not only on their performance (more color effects, durability, etc.), but also to comply with new societal demands on human health aspects and protecting the environment: the elimination of hazardous ingredients, e.g. lead pigments and the reduction of the use of organic solvents (VOC's). In order to apply paints they need to be fluid. A painter has the choice between solvent-dilutable or water-dilutable paints. Today the majority of paints for buildings are water borne (over 80 %).

Is there plastic in paint?

We know plastic in our society in the form of household appliances, packaging materials, plastic bottles or car parts. It is also known that plastic degrades only very slowly or not at all when it ends up in the environment or in oceans. For good reasons the littering of plastics gets therefore a lot of political and societal attention.

A plastic is in fact a polymer with a solid character. If the solid polymer is very small they would be considered as microplastic. The (petrol- or bio-based) polymer (or oil) in paints starts in a fluid form and turns solid upon drying. One could consider them as plastic because a dried paint film contains a lot less polymer than a 'real' plastic article.



ADVICE

To minimize release of microplastics from paint to the environment focus should be aimed at restricting release of wet paint to the sewer and collection of paint flakes during renovation. But when deciding on a binder we encourage the user to choose the type of paint that meet the technical demands required to ensure the most durable result.

Can the “plastic” from paint reach the environment?

With the current discussion on pollution from plastics the question then raises if paint is a contributor for such pollution. Its size of pollution will obviously be minimal in comparison to what comes down the rivers in Asia and streams into the oceans, but that does not mean that a closer look should not be made. So the question raises where would there be release of paint to the environment? And how serious is it.

If one analyzes where during the normal use of paints (in its fluid form) release may occur then use of two scenarios should be mentioned:

- Cleaning of brushes or rollers under the tap; relevant when a water-dilutable paint has been used (also known as dispersion paint). At the end of a paint job the painter who wants to save his brush or roller may wash-out the paint remainders and let them go down the drain. Not recommended (see CEPE's guide on brush and roller cleaning), but very easy to do.

Remark: such cleaning for brushes and rollers having used oil-based paints would use organic solvent (e.g. white spirit) which is understood not to dispose of via the sink.

- Landfill of left-over paint; would happen if the painter takes no responsibility for taking the containers with left-over paints to community collection points or if the local government does not offer such collection points.

The normal use of paints is not to end up in the environment so its release via the above routes would be residual.

How much release in reality would come from these two scenarios depends on **the behavior of the one who uses the paint**. It remains important that the user of paints realizes that paint (irrespective of the type of binder) is a chemical mixture even when it is water-dilutable. Responsible dealing with cleaning brushes or rollers and paint left-overs is to be encouraged.

There is a third possibility for release which is related to old paint layers on outdoor objects:

Paint-film particles (polymer or oil based) coming loose from outdoor surfaces; this can be either caused by the degradation of the paint-film under weather conditions (sunlight; rain) or by sanding of the old outdoor paint-film before applying a fresh layer of paint.

The amount of release from such degradation (the so called 'wear and tear' during the life cycle of the painted object) will depend on the quality of the paint that was used. The better the outdoor durability the less paint debris will come off.

The sanding in outdoors is again a behavioral matter. Cleaning up the sanding dust or containing it in a bag or vacuum cleaner attached to the sanding machine would minimize the release to the environment.

From all the potentially released particles in the above scenarios a large part will be filtered out at the water-treatment plants.

Ongoing research on water quality may bring more clarity in how far paints and which types are contributing to the issue of 'plastic' pollution.

Can you not take the polymer out?

That would be a drastic measure to beat the residual release here explained for which the human behavior is the main factor of influence.

Having explained earlier the function of the 'binder', one would lose some of the main characteristics of the paint if the polymer were taken out. Losing the film-forming capability the paint would no longer protect the substrate in a reliable fashion. A negative influence on the overall sustainability of the paint and the underlying substrate will be the result.

Alternatives to polymer based paints

There is a common misconception that polymers equal plastic equal petroleum based. But polymer simply means a molecule composed of many repeated subunits. The DNA in our cells are polymers – cellulose in wood is a polymer.

A paint will always contain a polymer. It is the user's duty to avoid that the 'polymer' is not becoming a burden to the environment.



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