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## WHEN THE PAINT TURNS YELLOW, YOU'LL SEE RED

By Bob Cusumano

You rejoice because you've landed that dream job. You've got the contract to paint that new mega-mansion in your home town. To add to the dream, the interior decorator chooses an easy color schedule with most rooms being painted white with a few areas being a pastel blue. And the best part of the dream is that all of the trim matches the wall color, so cut in will be relatively easy.

The interior drywall walls have a class 5 finish and so you decide to prime them with a quality acrylic primer sealer and finish them with a top quality latex flat. You also determine that you will prime all of the wood doors and trim with an easy sanding enamel undercoater and apply multiple finish coats of alkyd semi-gloss enamel. The decorator has said that she expects the trim to have a glass-like appearance, so you determine that the doors and trim must be sprayed to eliminate any brush marks. Therefore, you decide to finish paint the doors and trim followed by rolling the finish coat on the walls.

The job is going well and appears to be one in which you'll have a very satisfied customer and the job will prove profitable to you; the perfect combination. Since the job is so large, it is taking several months to complete. Areas where all of the work has been finished have been cordoned off so that damage to completed work is avoided. Then one day the decorator enters the completed areas and the dream job turns into a nightmare. All of the trim that you painted white is now a tan color and in the rooms where the walls and trim were painted a pastel blue, the trim is now a light green.

If you think the above description is a fantasy, you're mistaken, it's a real life story. What demonic force caused this reversal of ecstasy to agony? It's a problem known as alkyd yellowing.

The fact of the matter is that all alkyd paints yellow to some extent over time. The degree of the yellowing, and the length of time that it takes to yellow will vary depending upon the particular alkyd resin used in the manufacture of the particular paint product. The particular pigment used can also affect the degree of yellowing as zinc oxide, for example, has been found to retard yellowing. The cause of the yellowing or darkening is a photochemical reaction that occurs with certain vegetable oils used in alkyds. Because its a photochemical reaction, Sunlight retards the yellowing process and in areas of low

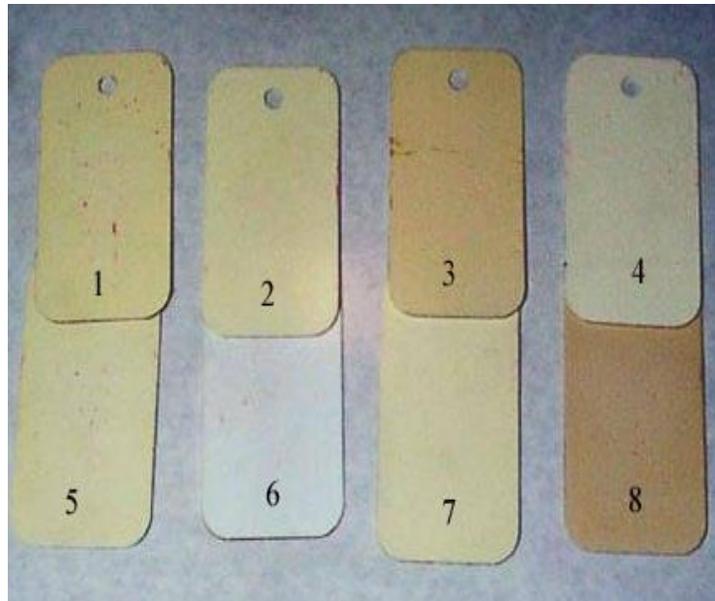
light, the effect is enhanced. For this reason, the interior of closet doors, pocket doors that slide into the wall cavity, and the interior of drawers are particularly susceptible.

Another factor in the alkyd yellowing phenomenon is that the presence of ammonia accelerates yellowing. In our job situation above, the decision to spray finish the doors and trim and then roll the walls inadvertently worsened the situation. Most latex paints, including the one used at the residence in question, contain ammonia which is released as the latex paint dries. When rooms are closed, as is common when painting to minimize airborne dust, the concentration of ammonia can become quite high.

So how can you predict the degree to which a particular alkyd paint will yellow over time? Well, one method is to purposely expose the paint to ammonia fumes. A test chamber, like the one shown below can be used. A sample of the paint should be applied to an inert material like a plastic laminate coupon. Ammonia is placed in the bottom of the jar and the paint sample is suspended above the liquid. The jar is sealed, and after a few days of exposure, the sample can be removed and the color compared to an unexposed sample to determine the degree of yellowing. By exposing various alkyd paints for the same period of time, the yellowing tendencies of various products can be compared.



That's exactly what we did for the painting contractor on the mega-mansion project. This photo shows the results of eight different alkyd semi-gloss paints that were exposed to an ammoniated environment.



Notice that all except sample 6 have some noticeable yellowing and darkening. Want to make a guess which one our unfortunate painting contractor used? Yes, you got it right; it was number 8. So, if alkyd paints turn yellow, why do contractors continue to use them? Well, it's because they like their advantageous properties like good adhesion, film hardness, flowing capability, scrub resistance, etc.

The morals of this story are many:

1. If you use an alkyd trim paint, use a product that your experience shows to be a low yellowing paint. Read the manufacturer's data regarding any cautions about its use.
2. If you're using products that you're not familiar with, do ammonia tests to give some indication of their tendency to yellow.
3. When using an alkyd trim paint, apply the latex wall paint first. Make sure that the rooms are well ventilated and have had ammonia fumes removed before the alkyd paint is applied.
4. Inform your customers to avoid using cleansers that contain ammonia.
5. Consider using latex products, acrylic epoxies, hybrid alkyd/latexes, and new generation alkyds. But make sure you're not trading one potential problem, that is yellowing for another potential problem like "blocking".

As is true in all instances, involving your knowledgeable and trusted paint supplier in the product selection process can provide important information so that a paint product can be selected that will provide both good appearance and good serviceability.