LOW VOC MARINE COATINGS

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JOTUN/VALSPAR MARINE COATINGS

The work described in this paper was not funded by the U.S. Environmental Protection Agency. The contents do not necessarily reflect the views of the Agency and no official endorsement should be inferred.

The marine environment contains many of the most corrosive atmospheric elements to be found anywhere on this planet. Ultra violet rays both direct and reflected from the surface of the water. Constant salt spray, high condensing humidities and even acid rain. These extreme conditions make the protection of metal a severe problem. Add to this intermittent immersion and total immersion in sea water for 24 - 36 months.

Fouling below the water by animal and plant organisms and extreme variations in climatic conditions round out this assault. Marine coatings are formulated to handle these varying degrees of assault.

Marine coatings are either applied in a shipyard where all necessary equipment is available to handle any situation, or applied by the crew of the ship where a roller and brush are the only tools available. Shipyards were able to apply so called 'exotic' coatings such as epoxies and urethanes. Full systems are shipyard applied from the primer to the topcoat. Ships crews on the other hand are mainly limited to maintenance and light repair work. The coatings are one pack and very user friendly. The basic coatings in this category were usually pure or modified alkyds. All of these coatings were historically high VOC because the technology or the need wasn't there to do anything differently.

California was the leader in reducing pollution. Rule 3 & Regulation 66 were the precursors of things yet to come. Louisiana was the next state to establish VOC regulations. Then came the Clean Air Act of 1990 which established the fact that the paint industry was part of the problem and we would have to reduce VOC's. The list of Hazardous Air Pollutants (HAP) was also out and many of the solvents used were on this list as well.

At this time many paint companies already had paints that met California rules and a separate line of coatings for the rest of the country. The California paints were harder to use and did not perform as well as the other paints. As stated before the technology was not always available. Raw material suppliers did not see the profitability in formulating products for one state.

What happened? With the Clean Air Act the industry had no choice but to change. A great deal of research has been done by raw material suppliers and paint manufacturers to develop low VOC products as good as or better than the high VOC coatings. Some technology has fallen by the wayside.

Lacquer dry coatings such as chlorinated rubber and vinyl may be a thing of the past. To get to the required VOC of 2.8 and still have a usable viscosity creates a challenge for the resin and coating formulator which is extremely difficult.

Alkyds have been developed to 2.8 #/gal. VOC. These products are generally higher in viscosity but are able to be applied with a brush, roller, or spray equipment. A little slower dry than the traditional alkyd coatings in most cases. As

with most of the low VOC coatings care must be taken to only get the required film build for proper dry.

Water base inorganic zinc primers have been around for quite a few years. Low VOC solvent based inorganic zinc primers have been developed. These can be used in the same applications as their predecessors.

Water borne coatings have come a long way also. Resins have been developed to give more durable coatings with good gloss retention. Single pack water borne acrylics can be formulated which are just as good as their solvent base counter parts. Early water resistance is being improved. Water borne epoxies have been developed that even have resistance to immersion. Basic drawback with using water is that it cannot be applied below 40°F.

Solvent borne and 100% solid epoxies. Resins have been developed with lower viscosities but equal performance to high VOC coatings. Generally these coatings either have no pot life or a very short pot life and must be used with plural component spray equipment.

Equipment has been developed to handle low VOC coatings that have high viscosities. Airless spray pumps have high ratios so that the paint is pumped at higher pressures. High Volume Low Pressure (HVLP) conventional equipment has been developed. It is good for spraying small areas with high viscosity coatings but is not fast enough for large areas such as ships hulls.

Two other areas of coatings are powder coatings and flame spray. Powder coatings in their present form are suitable for

small items that can be removed from the ship and painted in a shop. They require electrostatic application and curing at high temperatures. Flame spray can be done in situ. It is slow but very expensive.

The marine paint industry has met the challenge to make low VOC coatings that are able to protect marine structures. We are still making improvements in coatings and are always on the look out for new technologies to make better coatings that are environmentally friendly.