

Vanguard Sail Boats – Transition from acetone to an aqueous blend solvent and then to Bio-Solv.

Overview:

Vanguard Sail Boats, the manufacturing arm for LaserPerformance, is a major manufacturer of small to medium sized sailboats located in Portsmouth, Rhode Island. Their manufacturing plant produces about 150 boats each month sold under various brand names including Laser, Sunfish, and Optimist. Many of these boats are built for competition, manufactured using high quality knitted and woven fabrics in a fiberglass composite layup process, gelcoat and polyester resin.

Composite manufacturing plants use large amounts of acetone and other petro chemical solvents for cleaning of molds, tools, spray and chopper guns, resin line flushing and equipment cleaning.



Although efficient cleaners, these solvents are Hazardous Materials (Hazmat), are extremely flammable, and many contain carcinogens, and Hazardous Air Pollutants (HAPS). When used in cleaning operations, the dirty solvent is collected in 55 gallons drums for costly Hazmat disposal. Because of environmental, worker health and safety concerns, and Hazardous Material (Hazmat) shipping, storage and removal costs, many companies are converting from acetone, lacquer thinner and toluene to safer bio-degradable solvents.

Vanguard wanted to be proactive and make the move away from acetone in its plant for worker safety, to reduce environmental impact, and reduce or eliminate Hazmat disposal costs. They initially moved from acetone to an aqueous based, bio-degradable product (“Product A”) in January of 2008. Although Product A was a significant improvement over using acetone in terms of improved safety and product yield, there were two costly downsides. First, the “goo” or sludge, a byproduct of the cleaning operation required Hazmat removal. Second was corrosion of the equipment and tools due to the solvent’s water content. Unwilling to go back to using acetone in the plant, Vanguard decided to test Bio-Solv as solution for their cleaning operations. The wanted to verify Bio-Solv’s claims that it would not corrode the tools and that it’s sludge would form a solid. They hoped that the solid could then be safely thrown away, avoiding hazardous waste disposal and associated costs.



Using a Power Roller for fiberglass wet out.

Objective:

Find an environmentally friendly way to clean the tools and equipment used in Vanguard’s plant that is cost effective, safe for workers, non-flammable, and reduces or eliminates hazardous waste.

Case Study:

Test Product A against Bio-Solv in a comparative “head to head” test in three separate cleaning operations at the manufacturing plant, comparing results.

- 1. Tool Cleaning Operation:** 5 and 10 gallon solvent cleaning stations are used to clean the rollers, scissors and other hand tools used on the production line. The workers rinse the tools in the solvent agitating them and brushing them on the built in bristle brushes. Once clean they can be returned to service.

Observations: Both solvents held up well for this operation lasting much longer than acetone and without the fire or explosion hazards. Although both solvents effectively clean resins, Bio-Solv cleaned the tools as well as, or better than, Product A without rusting or corroding them. With both solvents the resin sludge settles to the bottom of the cleaning station tub. After a month or two the liquid is poured off and reused, the sludge is placed into a 5 gallon bucket. The Product A sludge remained in a fluid form requiring Hazmat disposal. The Bio-Solv sludge eventually cured to a solid.



Plant workers clean tools at cleaning station

- 2. Line Flushing Operation:** Pressure pots are used to periodically flush catalyzed resin from power rollers and associated plumbing



Flushing Power roller with Bio-Solv

lines in the plant. A pressure pot is filled with solvent and pressurized to flush lines, rollers and guns. The solvent/resin mixture is then collected in buckets at the exit points. The solvent is then poured back into the pressure pot and used again.

Observations: There are 7 stations in the plant flushed 5 – 8 times each day depending on the plant’s output. Product A loaded up with resin and eventually became too thick to travel through the lines and was put into Hazmat Drums. The Bio-Solv was used for 1-2 weeks and then gelled when it “loaded up” with catalyzed resin. The gelled material was placed in a 5 gallon bucket which eventually hardened to a solid.

2. Finishing Cleaning: 3 gallon pails with shelves are used with brushes, tools and rags to remove excess polyurethane adhesives or other contaminants from the boats as they come off the production line.

Observations: Vanguard uses large (3 gallon) pail size, cleaning stations for this cleaning operation. Due to the large volume of solvent and the light duty cleaning chores, Bio-Solv has been in production for 2 months and is still clean, with no end in sight.

Additional Observations: Bio-Solv does not feel as “greasy”, leaves no film behind on surfaces and dries more quickly than Product A.

Conclusions:

The cost difference between Product A and Bio-Solv is negligible with both offering higher yields over acetone. There are really two main differences between the solvents. First, when using Bio-Solv, the sludge hardened to a solid where Product A produces a sludge that does not harden and requiring Hazmat disposal. Bio-Solv did not rust or corrode metal tools where Product A did.

Summary:

Vanguard previously converted their cleaning operation solvent from acetone to Product A. There were some undesirable issues with Product A including the inability to cure the sludge created during cleaning into a solid and corrosion of metal surfaces of tools and equipment. Vanguard tested Bio-Solv and found it to perform as well or better than Product A. The sludge/Bio-Solv mixture cures to a solid, saving money and aggravation dealing with Hazardous Material (Hazmat) waste disposal. Vanguard now uses Bio-Solv exclusively for all production cleaning operations at their manufacturing facility.

Bio-Solv is produced, sold and supported by MAS Products, a Phoenix Resins Inc. company. This case study was produced by MAS products using information and pictures obtained directly from Vanguard. MAS Products is working with Vanguard to create some additional cleaning stations, custom designed for their operation and a drying station to cure the sludge more quickly. MAS Products is proud to assist Vanguard in their efforts to improve their processes making them greener and safer for workers and the environment. We thank Vanguard for their assistance.

For more information about Bio-Solv visit www.GreenAcetone.com or contact the company:

MAS Products
2615 River Road, #3A
Cinnaminson, NJ 08077
856-303-9245
www.MASepoxies.com



3 Gallon Post-Production station

Cleaning Stations, Recycling and Sludge Processing



10 gallon cleaning station used to clean tools and allow Sludge to settle to the bottom.



5 gallon cleaning station with integrated brush.



This 5 gallon bucket is 1/2 full of gelcoat sludge. Pour the liquid Bio-Solv off for reuse.



This 5 gallon bucket contains gelled resin sludge from line flushing – about the consistency of stiff Jell-O.



Workers dump the sludge buckets into pans to increase surface area speeding curing time.



Pans are dumped into a shallow tray and material is spread out to cure to a solid for disposal.