Pinellas County Pollution Prevention and Resource Recovery Program
POTENTIAL POLLUTION PREVENTION MEASURES FOR FIBERGLASS MANUFACTURING

1. Best Management Practices

- Control materials inventory to more efficiently utilize raw materials (ie. limit the amount of clean-up solvent issued to lamination employees per day)
- Localize & isolate high emission & hazardous waste-generating operations
- Confine gel coat applications
- Filter contaminated air by dry or wet filtration
- Incinerate or filter styrene emissions that cannot be prevented
- Control air flow & exhaust
- Use gloves to reduce the number of times employees must clean their hands
- Use containers with self-closing lids for work station clean-up solvents

2. Use of Chemicals

- Substitute acetone with solvents that dissolve resin, but do not evaporate as readily (ie. dibasic esters and Ship Shape)
- Use aqueous emulsifiers to separate resin. Aqueous emulsifiers do not evaporate & eliminate emissions
- Use additives for suppressing the release of styrene (Resin suppliers can provide information on various suppressors). ie. Catalysts such as benzoyl peroxide or using UV curing resins, low styrene resins
- Choose resins that reduce both the styrene and total monomer content to effectively reduce voc emissions
- Recover and recycle spent acetone and other clean-up solvents

3. Changes to Production Processes or Equipment

- Use air assisted airless spray guns or high volume low pressure spray guns for resin applications that require spray lay-up to reduce material losses due to excessive fogging, overspray, turbulence, and bounce-back
- Utilize fiber reinforcements that are pre-saturated with resins (pre-pregs) to practically eliminate the atomization of pollutants
- In-house resin impregnation would minimize external emissions and can be setup to feed saturated reinforcing materials directly to the molding operation
- Roller dispensing of resin reduces styrene emissions without requiring modifications in molds & materials. Catalyzed resins can be transferred to the molding surface to eliminate material losses from spray vaporization, fogging, overspray, turbulence, & bounce-back
- Utilizing a closed molding system such as vacuum bag molding or infusion reduces waste & emissions of styrene. Resins are confined until curing is complete

The above ideas are only suggestions for waste minimization in fiberglass manufacturing. As with any new process or change, a facility needs to consider the following before implementing a change in chemicals or procedures:

- Technical feasibility & product quality
- Worker safety & retraining
- Waste handling & environmental impact

Potential Resins
For Styrene Emission Reductions

Considerations	Low Styrene Resins	Low Vapor Pressure Monomer Resins	Vapor Suppressed Resins
Working Properties	More viscous than conventional resins, difficult to apply even layers	Similar to conventional resins	Requires extra process step to prepare surface between layers
Laminate Strength	Air entrapment may create weaker laminate strength	Similar to conventional resins	Weak laminate structure due to poor secondary bonding between layers
Costs	Similar to conventional resins	Double the cost of conventional resins	5-10% more than conventional resins, increased labor costs for between-layer surface preparation
Current Use	Boat decks, seats, bait boxes, tubs, showers, spas	Plants are testing low vp resins and manufacturers are developing economically feasible substitutes	Small boats and parts that do not require high strength characteristics, problems with bonding need to be resolved

Table information provided by U.S. EPA article, *Assessment of VOC Emissions from Fiberglass Boat Manufacturing,* Research Triangle Park, NC: U.S. EPA, May 1990.