

POLLUTION PREVENTION

Waste Reduction Assistance for the Fiberglass Fabrication Industry



Provided by:

Pinellas County Department of Environmental Management

Air Quality Division Pollution Prevention Program

300 South Garden Avenue

Clearwater, FL 33756

(727) 464-4422

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Pinellas County Department of Environmental Management's

V I S I O N

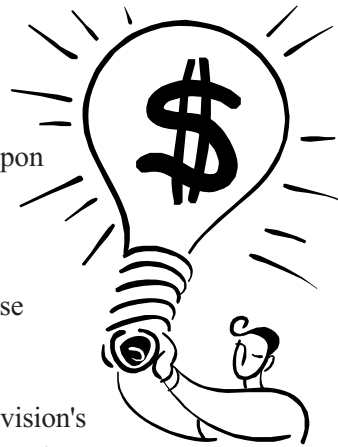
*The Department of Environmental Management is
dedicated to providing responsible leadership necessary to
manage our natural and urban environment to meet the
needs of our present and future
Pinellas County citizens.*



About This Manual

This manual is designed to assist businesses in the fiberglass fabrication industry with waste reduction in operations. Excessive waste is an indicator of the inefficient use of raw materials and resources. Through proper education and training, business can minimize the amount of liquid, solid, and gaseous waste in Pinellas County, while improving their economic viability.

Some of the ideas presented in this manual may not be practical for all fiberglass operations. Each business is encouraged to evaluate waste reduction opportunities based upon their facility's individual operations. The same waste reduction idea that works for one business may not necessarily work for all. Additional opportunities may exist beyond those identified in this manual.



Manuals are developed by the Air Quality Division's Pollution Prevention Program of the Pinellas County Department of Environmental Management, a non-regulatory program that provides waste reduction technical assistance. Program staff provide information on new technologies, process modifications, substitute products, and current industry-specific Best Management Practices (BMPs). Staff can assist businesses in their efforts to become more efficient, profitable, and competitive, while complying with regulatory requirements. As a Pinellas County business, no fees are charged for using the Pollution Prevention Program's services. On-site waste reduction assistance is available by contacting program staff at (727) 464-4422.

The P2 Program can provide additional resources regarding project funding, energy efficiency, product/equipment technology, and technical assistance. For information, contact our program at (727) 464-4761.

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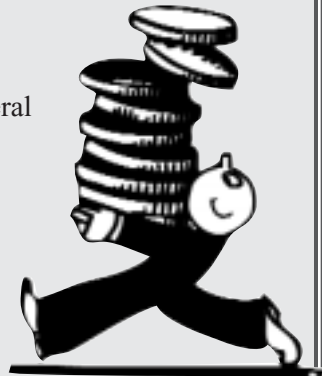
Introduction

The 1990 Clean Air Act Amendments (CAAA) require the fiberglass fabrication industry to reduce emissions of volatile organic compounds (VOCs) and hazardous air pollutants (HAPs). Regulatory requirements can increase operating cost while decreasing a business' ability to compete. In fact, increased competition demands reducing costs.

However, Best Management Practices (BMPs) and new technologies are available that offer facilities an opportunity to comply with the regulations and reduce emissions while saving money and improving efficiency.

Waste reduction practices can:

- ◆ Reduce the use of raw materials
- ◆ Minimize the expense of waste disposal
- ◆ Reduce the exposure of workers and the general public to hazardous and toxic materials
- ◆ Reduce complaints from nearby citizens
- ◆ Reduce the threat of product liability
- ◆ Maximize compliance with environmental regulations and requirements



By practicing waste minimization you can improve your bottom line while increasing your business' competitive ability.

What is pollution prevention?

Pollution Prevention or P2 is the reduction or elimination of pollutants or wastes at the source. The idea behind pollution prevention is to avoid producing the waste in the first place. If the waste is not produced, then handling, storage and disposal issues do not exist. Having less waste means a better environment for all of us.

Why practice Pollution Prevention? Preventing pollution has its benefits!

You can:

- ◆ Reduce facility-wide wastes!
- ◆ Save money!
- ◆ Protect workers, the public, and the environment!
- ◆ Improve your company image!
- ◆ Reduce the risk of liability!

How do I use this booklet?

- ◆ Read the information booklet. Pollution prevention (P2) should be part of your company's policy.
- ◆ Evaluate your facility's wastes to see how much and what kind of waste is being produced. This will make it easier for you to spot areas where pollution prevention tips can be applied.
- ◆ Identify potential pollution prevention measures provided in this booklet that may help your business.
- ◆ Evaluate any P2 measures before you put them in place. Consider economic feasibility, productivity effects, and long-term usefulness.
- ◆ For assistance, contact the Pollution Prevention and Resource Recovery Program at (727) 464-4422.

Wastes Associated With Fiberglass Operations

The first step towards waste minimization is to identify your waste sources.

During your waste assessment, ask yourself the following:

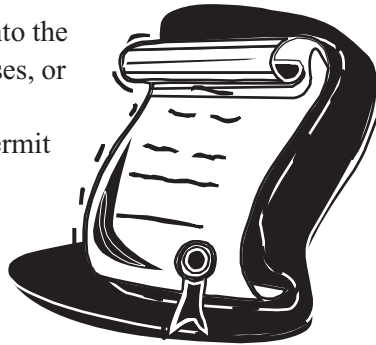
- ◆ What are the wastes created by the materials I use?
- ◆ Is there a safer material that will do the same job and will reduce wastes?

Simple changes such as practicing good housekeeping methods and training your employees in waste reduction can simplify waste management. The following table summarizes the wastes from individual fabrication processes.

FABRICATION PROCESS	MATERIALS COMMONLY USED	TYPICAL CHEMICAL INGREDIENTS	WASTES CREATED
Gel Coating	Mold release agents, Water soluble barriers for paint adhesion, clear or pigmented resin mix, catalyst	Wax, glass, polyvinyl alcohol, resin, MMA, styrene, MEKP	Atomization of resin, organic vapors, rags
Resin Application and Curing	Liquid resin, catalyst, reinforced fibers, components of polyurethane foam	Organic peroxides, unsaturated acids, poly-functional alcohols, monomers (e.g. styrene, vinyl toluene, etc.)	Particulate emissions, rollers, brushes, gloves, monomer evaporation from uncured resin, rags
Assembly	Glues for carpet application, paints, lacquer thinner, petroleum distillate, putty	1,1,1 -trichloroethane, styrene, toluene, xylene, stoddard solvent, acetone, other solvents	Particulate emissions, solvent evaporation from paints
Clean-up (tools, hands, equipment)	Mold cleaning chemicals, solvents	Acetone, occasionally other solvents such as methyl ethyl ketone, DBE	Spent acetone, wastewater from spent emulsions (water/detergent)
Resin Storage	Resins	Styrene, occasionally other monomers	Air emissions from the volatilization of styrene
Waste Disposal	Solvents, leftover reinforcement fibers and resin	Acetone, DBE, polymerized resin	Scrap reinforcement material, polymerized resin, spent solvents

Air Emissions

There are many wastes that are released into the air through evaporation, combustion processes, or otherwise. The release of many of these chemicals is regulated and requires an air permit depending on the quantity released. This includes particulates, sulfur dioxide (SO₂), carbon dioxide (CO₂), nitrous oxides (NO_x), chlorofluorocarbons (CFCs), Volatile Organic Compounds (VOCs), and many “Hazardous Air Pollutants” (HAPs). As a fiberglass fabricator, you are responsible for acquiring the necessary permits for any air pollutants you produce. Pinellas County Department of Environmental Management Air Quality Division’s Compliance and Enforcement section, (727) 464-4422 can provide you guidance on operations that require permits for air emissions based on overall emissions, specific device or pollutant.

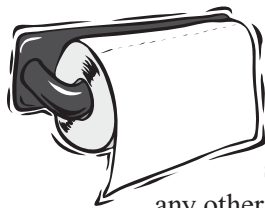


Industrial Rags

Industrial rags can be either disposable wipes or leased fabric rags used for equipment and tool cleaning or for hand wiping. As with all wastes, it is up to the generator to determine if the rags are hazardous as defined by the federal Resource Conservation and Recovery Act (RCRA). Rags may be hazardous or non-hazardous depending on the type of residues left on the rag after use.

Disposable Rags/Wipes

Rags/wipes destined for disposal are considered a RCRA hazardous waste if they contain any residue that is a RCRA hazardous waste (e.g. many solvents). Hazardous waste determination guidance is provided in the “Hazardous Wastes” section of this manual on page (6). If your disposable rags/wipes are a RCRA hazardous waste, they must be handled, stored, managed and disposed of in the same manner as any other RCRA hazardous waste.



Leased Rags

If you determine your leased rags are not a hazardous waste, they do not have to be managed as a hazardous waste. If they are a hazardous waste, they must be managed as a hazardous waste until picked up for laundering. They do not require a hazardous waste manifest.

Check that the laundry facility cleaning your rags has an Industrial Wastewater Discharge Permit allowing it to discharge wastewater from laundering industrial rags. Discharge of this wastewater to a septic tank is prohibited.

Regardless of the type of rags you use:

- ◆ Never allow rags to dry as a form of treatment. The vapors could build up and mix with other air contaminants, creating a fire and health hazard.
- ◆ Keep used rags in an approved storage container until disposal or until the laundry service picks up.
- ◆ Keep the rag storage container closed at all times to prevent evaporation.
- ◆ Dispose of all rags properly as required by waste regulations and according to your non-hazardous/hazardous waste determinations.
- ◆ Reduce rag use by only using solvents when absolutely needed, improving work practices and using safer cleaning alternatives.

Hazardous Wastes

A waste is considered a hazardous waste if:

- 1) It has any one or more of the following characteristics:



Ignitable wastes are easily combustible or flammable. They have a flashpoint of less than 140°F or an alcohol content of 24% or more. (The flashpoint is the lowest temperature at which the vapor of a combustible liquid can be made to ignite in air.)

Ignitable (D001)



Corrosive wastes are liquids that dissolve metals and other materials, or burn the skin. They have a pH of 2 or lower, or 12.5 or higher.

Corrosive (D002)



Reactive wastes are unstable and react rapidly or violently to shock, heat, or pressure, or when mixed with water or other materials.

Reactive (D003)



Toxic wastes generally have adverse health effects. They need only contain a small amount of a certain material such as heavy metals or toxic organics.

Toxic (D004)

OR

2) It is listed as a hazardous waste in the Code of Federal Regulations, 40 CFR Part 261. This list is very long and may include chemicals that you use daily. If you are unsure, it is suggested that you refer to the list cited and have your waste tested by a laboratory.

Handling and Disposal of Hazardous Wastes

The proper handling of hazardous wastes is very important in order to ensure the health and safety of the public and to protect the environment.

Some important things to remember are:

- ◆ Never pour waste fluids on open ground, in storm drains, or down shop drains.
- ◆ Never mix hazardous and non-hazardous wastes. Even a little hazardous waste can make the entire mixture hazardous and more expensive to dispose of properly.

Containers

- ◆ Maintain containers in good condition. Prevent leaks, ruptures and the accumulation of rainwater on the top of drums.
- ◆ If a container leaks, transfer all of the waste to a new container.
- ◆ Keep lids on, and containers closed, when not in use.

- ◆ Use funnels when pouring liquids.
- ◆ Use containers that are compatible with the waste being stored.
- ◆ Don't mix different or incompatible wastes in the same container.
- ◆ The proper handling of hazardous wastes is very important in order to ensure the health and safety of the public and to protect the environment. Some important things to remember are:
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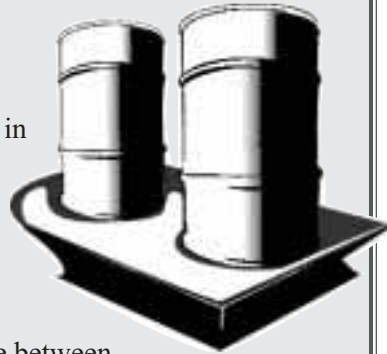
Labels

Proper labeling can reduce accidents and ensure proper disposal. The example of a label below shows some of the information that should be included.

HAZARDOUS WASTE
(or NON-HAZARDOUS WASTE)
FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
If found, please contact the nearest police
or public safety authority or the U.S. EPA
<type of waste>
<your business' name and address
and manifest document number>
<accumulation start date>
(the date when waste was first put in the drum)
<federal waste code numbers>

Waste Storage Areas

- ◆ Try to store all hazardous wastes in a single area, however do not store incompatible materials beside each other. Satellite collection points are allowed for work-in-progress, but should be moved to the main storage area once the container is filled or not in use.
- ◆ Store on an impervious (sealed) surface, i.e. resists infiltration or corrosion by the stored materials.
- ◆ Store under cover, whether indoors or outdoors, to keep out the rain. Be sure containers are properly sealed.
- ◆ Secondary containment should be provided that is able to contain at least 110% of the largest container's capacity in case of leaks, spills, or punctures. It should have an impervious (sealed) surface and should be under cover, preferably indoors.
- ◆ Ensure that there is sufficient aisle space between drums to allow complete inspection for leaks or damage.
- ◆ Check with your local fire department for their code requirements regarding chemicals associated with fiberglass resin operations (under National Fire Protection Association (NFPA) Standards, Chapter 15).



Transportation and Disposal

- ◆ Hazardous waste should be shipped out by a properly permitted hauler to an EPA-approved treatment, storage, and disposal facility. Check for all the proper local, state, and federal licenses.
- ◆ Use reputable permitted companies for transport and disposal. You are forever liable for any hazardous waste that you generate: a “cradle-to-grave” liability. Even if you have proper documentation, you may still be a potentially responsible party to a clean-up if your waste contributes to the contamination of the environment.

Inspections and Record Keeping

- ◆ Keep all records of hazardous waste handled for at least three (3) years on-site. This includes amounts purchased, stored, reused, and hauled away .
- ◆ Keep records of lab tests for at least three (3) years.
- ◆ Keep land disposal restriction forms for at least five (5) years.
- ◆ Inspect storage containers and areas for leaks or damage at least once per week and maintain a written inspection log on-site for at least three (3) years.
- ◆ Keep any training records for at least three (3) years.
- ◆ An EPA identification number should be obtained by any facility generating a hazardous waste, unless officially classified as a “Conditionally Exempt Small Quantity Generator.” Contact the address below:

**Florida Department of Environmental Protection
Southwest District
Hazardous Waste Management
3804 Coconut Palm Dr.
Tampa, FL 33619-8318
(813) 744-6100**

Regulated Non-Hazardous Wastes

Although not classified federally as a hazardous waste, there are many materials that are regulated stringently in Pinellas County. When in doubt, treat a material as a hazardous waste until you are able to verify that it is not, and then determine what are the correct handling and disposal measures. A common example of this type of waste is motor oil.



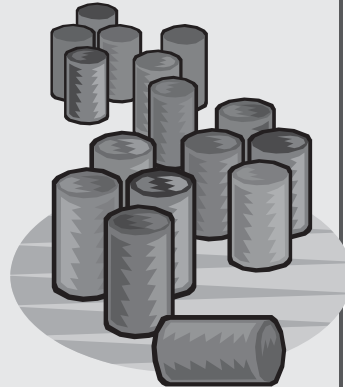
Hazardous Materials

Although less stringently regulated than hazardous wastes, the proper storage and handling of hazardous materials is equally important. Many of the storage and handling practices described above for hazardous wastes should, and in some cases must, be applied to hazardous materials as well. This includes certain labeling and spill prevention measures.

Hazardous Materials Storage

Below are some suggestions for storage of hazardous materials:

- ◆ Store on an impervious (sealed) surface, i.e. resists infiltration or corrosion by the stored materials.
- ◆ Store under cover, whether indoors or outdoors, to keep out the rain. Be sure containers are properly sealed.
- ◆ Provide secondary containment that will hold up to 110% of the largest container stored in the area. This area should be able to contain any leaks or spills.
- ◆ Label containers properly, including contents and date of generation for any hazardous wastes.
- ◆ Make sure drums are easily accessible but not stored in high traffic areas where they can be easily knocked over. Regularly check for any signs of leak, rust, etc.



One chemical of particular concern in fiberglass fabrication operations is Methyl Ethyl Ketone Peroxide (MEKP). MEKP is highly explosive! MEKP should be stored according to the storage requirements identified on the chemical's Material Safety Data Sheet (MSDS).

Objectionable Odors

Uncontrolled styrene emissions may result in objectionable odor complaints from nearby residents. Periodically assess your operations and minimize uncontrolled emissions to avoid such complaints. Common assessment approaches include surveying and identifying odor sources,

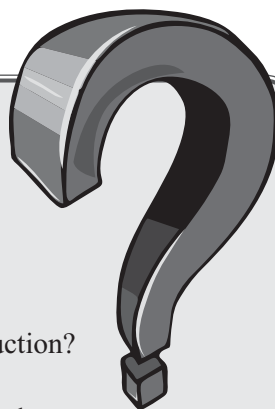
surveying the nearby properties and air dispersion modeling. Factors such as ventilation, location of nearby properties in relation to process operations, and local weather conditions can all affect the dispersal of air contaminants. For example, humid air will carry odors better and strong winds help disperse odors. On a windless day, odors may linger in the area and be more noticeable. Odor complaints may occur more frequently during cooler weather when more people are apt to open their windows and have outdoor activities.

Gel-coating processes may be one of the primary operations that could result in objectionable odors due to application methods and styrene content. Pollution prevention opportunities to reduce such emissions are discussed in the following section. Consider these opportunities in your operations.

Pollution Prevention Opportunities

Effective pollution prevention measures can reduce operational costs and improve your bottom line. Pre-testing P2 ideas can eliminate unnecessary loss of capital expenditures on an idea that may not prove viable for your facility operations. Ask yourself the following questions before implementing a change:

- ◆ What new waste streams will be created and how will they be handled?
- ◆ Are there any health or safety risks associated with the new materials?
- ◆ What is the effect on product quality and production?
- ◆ What experiences have other members of my industry had with this alternative?
- ◆ Will a new product reduce the amount of other materials used?



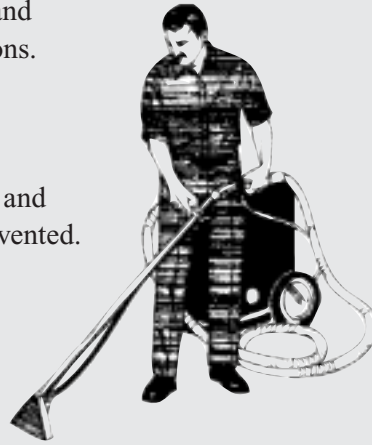
Keep in mind... the same prevention idea that worked for one business may not necessarily work for yours. Troubleshoot all prevention ideas first before you put them in place!

Always consider your facility's specific needs and requirements before using any of the opportunities identified in this booklet. Evaluate the effectiveness of the change in your operations and consider any new waste streams that may be created.

Best Management Practices/Housekeeping

Poor housekeeping can result in spills and overflows, increasing your expense to replace lost material and the costs for treatment and disposal. It can also lead to accidents and worker injury. Good housekeeping is one of the easiest and least expensive ways to reduce wastes. Here are some tips:

- ◆ Control materials inventory to more efficiently utilize raw materials (e.g. limit the amount of clean-up solvent issued to lamination employees per day). Mark the purchase date on containers and adopt a "first in, first out" policy, so that older materials are used up before new ones are bought. Buy only the amount of materials needed. Buy materials in small quantities if only small amounts are required.
- ◆ Localize and isolate high emission and hazardous waste-generating operations.
- ◆ Confine gel coat applications.
- ◆ Ventilate and filter contaminated air and styrene emissions that cannot be prevented.
- ◆ Control air flow and exhaust.
- ◆ Use gloves to reduce the number of times employees must clean their hands with solvent.
- ◆ Keep all containers closed and properly labeled. Use containers with self-closing lids for work station clean-up solvents.
- ◆ Keep your facility clean and your floors dry. Sweep floors and use dry clean-up techniques. For example, use absorbent material for spills and if necessary, use a very small volume of water for final cleanup. This material should then be disposed of properly.



- ◆ Keep storage and work areas clean and well organized. Do not let resin accumulate on floors and other surfaces.
- ◆ Wastes should be stored in a covered area to prevent stormwater runoff and protect the containers from weather exposure.
- ◆ Install spill containment.
- ◆ Do not mix hazardous chemicals with non-hazardous chemicals. This will mean all of the waste will have to be treated as a hazardous waste. This can be very expensive.
- ◆ Dispose of all rags properly as required by waste regulations and according to your non-hazardous/hazardous waste determinations.
- ◆ Reduce rag use by only using solvents when absolutely needed, improving work practices and using safer cleaning alternatives.



Material Substitution/Chemical Usage

Less toxic and volatile solvent substitutes are available for use in the curing process and/or for cleaning. Many substitutes are biodegradable, water-soluble, resin bed compatible and recoverable.

- ◆ Replace organic solvents with aqueous emulsifiers to separate resin. Emulsifiers create virtually no air emissions, are biodegradable and non-flammable.
- ◆ Modify resin formulation. Use additives for suppressing the release of styrene or choose resins that reduce both the styrene and total monomer content. Low styrene resins, low vapor pressure resins, and vapor-suppressed resins have the potential to reduce your raw material losses to styrene emissions. Consider a resin substitution that best satisfies your production needs and significantly reduces emissions.

- ◆ Vapor-suppressed resins contain a wax-like additive that inhibits the release of styrene during curing. An extra process step is required to lightly sand the surface of cured parts prior to applying the next laminate layer.

- ◆ BPO-catalyzed resins and low-styrene resins require minimal changes to spray equipment and the cost is similar to conventional resins. Use of these resins can significantly reduce styrene emissions.



- ◆ Low VOC/non-HAP polyester resins are currently on the market. Emissions testing results are available for some of these resins. The Indiana Clean Manufacturing Technology and Safe Materials Institute (CMTI) and its Coating Applications Research Laboratory (CARL) located at Purdue University performed some testing on alternate types of gel coats (<http://www.ecn.purdue.edu/CMTI/CARL/info/zero-emissions>). Contact various resin suppliers to obtain additional information regarding these resins.
- ◆ Reduce acetone emissions. Acetone is commonly used to clean polyester resin from tools and other surfaces. Acetone evaporates quickly. High evaporative losses can mean increased acetone purchases to replace lost solvent. Increased purchases mean increased operating costs. In addition, if you reclaim your acetone on-site, the still bottoms are considered hazardous wastes and require appropriate hazardous waste disposal. Substitute acetone with solvents that dissolve resin, but do not evaporate as readily. Higher boiling solvents or aqueous cleaners will reduce your solvent lost to evaporation. High boiling solvents include terpenes, n-methyl pyrrolidone (NMP) and dibasic esters (DBE).
- ◆ Recover and recycle spent acetone and other clean-up solvents. Install an on-site distillation unit or manually decant and reuse spent solvents. Even the still bottoms can be re-used in putty.

Process Modifications

There are several process modifications that can minimize your waste streams and increase the efficiency of operations in your facility. Process changes that reduce the exposure of fresh resin surfaces to the air can significantly reduce evaporative losses. Alternative material application systems and fabrication techniques can reduce solvent/resin spillage, over-sprays and air emissions.

- ◆ Spray Orientation - Simple techniques such as spray orientation can reduce over-spray. Modify the orientation of spraying based on the shape of an object to minimize product waste.
- ◆ Spray Delivery Systems - Increase transfer efficiency while minimizing excessive fogging, over-spray, and bounce-back by considering alternative resin delivery systems. Low pressure delivery systems can reduce cost and maintenance of the equipment in addition to minimizing work area clean-up.
- ◆ Flow Coating and Impingement Technologies - Non-atomized dispensing of resin using flow coaters and impingement-type nozzles can reduce styrene emissions. Flow-coat nozzles typically produce a non-atomized, linear stream resin, while impingement nozzles produce a fan shaped-stream with little or no air involved. Impingement nozzles have the advantage of dispersing glass fibers uniformly in the laminate. Impingement nozzles have dispensing holes that deliver the resin at angled streams that intersect to develop a spray pattern which further reduces emissions. A locally developed impingement technology consolidates non-atomized resin gel-coat streams as they leave the tip of the nozzle. This technology, when compared to an airless/air assist chop and gel-coating system shows substantial reductions in resin and gel-coat emissions during application.
- ◆ Non-Spray Application Methods - Various non-spray application methods are available to reduce styrene emissions and losses of raw material resulting from over-spray.



- * Pre-Spray Fiber Reinforcing (pre-pregs) - Pre-pregs are fiber reinforcements that are pre-saturated with resins, eliminating most resin atomization, minimizing cleanup and disposal. Resin-to-fiber ratios are controlled with pre-pregs usage, atomization is virtually eliminated. Purchasing pre-pregs can be more costly in both purchase costs, refrigerated storage requirements and the energy usage for curing.
- * In-House Resin Impregnators - In-house resin impregnation minimizes external emissions and can be set up to feed saturated reinforcing materials directly to the molding operation, use lower-cost polyester resins and fiberglass materials than pre-pregs.
- * Resin Roller Dispensers - Catalyzed resins are rolled onto the molding surface eliminating material losses that result from traditional spray applications (over-spray, vaporization, fogging, turbulence, bounce-back). The need for high levels of make-up air is reduced. Roller dispensers reduce styrene emissions without requiring modifications to the molds or materials. Existing spray gun equipment can usually be adapted to function as a resin roller.
- * Closed Molding Systems - Closed molding systems (e.g. vacuum bag molding or infusion) reduce wastes, odors and emissions. Resins are confined during the application and curing processes. Little, if any, resin is wasted.

Additional information on these systems is available by contacting our program at (727) 464-4422.

Equipment Modifications

Equipment modification can reduce partially cured resin and scrap wastes.

- ◆ Modify resin pan size to reduce resin waste. The pan should fit the width of the fabric with only enough additional width to catch drips when removing the saturated fabric.
- ◆ Install adjusting devices that can reduce the treater pan volume when coating narrow fabric.

- ◆ Reduce the size of the pipe connecting the mix tank to the treater tank to minimize the amount of discarded resin from inside the pipe. Modifying the pipe size requires a flow rate analysis to insure that an acceptable flow rate is maintained.

The pollution prevention ideas discussed in this manual provide opportunities to minimize wastes in fiberglass fabrication operations. As with any new opportunity, a facility should consider the following before implementing a change in chemicals or processes:

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

For additional assistance on waste reduction in your fabrication operations, refer to the following Resources Section of this manual.

Resources

Fire Departments

Belleair Bluffs:.....(727) 584-8392	Pinellas Park:(727) 541-0712
Clearwater:.....(727) 462-4334	Pinellas Suncoast:(727) 595-1117
Dunedin:.....(727) 298-3102	Safety Harbor:(727) 724-1520
East Lake:.....(727) 784-8668	St. Pete Beach:(727) 363-9207
Gulfport:.....(727) 893-1062	St. Petersburg:(727) 893-7694
Largo:(727) 587-6714	Seminole:(727) 393-8711
Lealman:(727) 526-5650	S. Pasadena:(727) 344-1666
Madeira Beach:(727) 391-3400	Tarpon Springs:(727) 938-3737
Oldsmar:.....(813) 855-1059	Treasure Island:(727) 547-4590
Palm Harbor:(727) 784-0454	Florida Forestry:.....(941) 648-3168

Building Departments

Belleair Beach:.....(727) 464-3168	Belleair Town:.....(727) 588-3769
Belleair Bluffs:.....(727) 584-2151	Clearwater:.....(727) 562-4567
Belleair Shore:(727) 593-9296	Dunedin:(727) 298-3202

Gulfport:(727) 893-1000	Redington Beach:.....(727) 391-3875
Indian Rocks Bch:.....(727) 596-4759	Redington Shores:.....(727) 397-5538
Indian Shores:(727) 595-4020	Safety Harbor:.....(727) 724-1515
Kenneth City:(727) 544-2564	St. Pete Beach:(727) 363-9240
Largo:.....(727) 587-6711	St. Petersburg:(727) 893-7231
Oldsmar:(813) 855-2730	Seminole:(727) 393-8711
Madeira Beach:(727) 391-9951	S. Pasadena:(727) 343-4192
N. Redington Bch:(727) 391-4848	Tarpon Springs:.....(727) 942-5617
Pinellas Park:(727) 541-0752	Treasure Island:.....(727) 547-4575

Assistance Centers and Information Sources

Pinellas County

Department of Environmental Management,

Air Quality Division:(727) 464-4422

Household Electronics and Chemical Collection Center

24 hour Hotline:.....(727) 464-4623

Utilities/Solid Waste:(727) 464-7500

State of Florida

Department of Environmental Protection

Main Switchboard:(813) 744-6100

Hazardous Waste Compliance Assistance Program:(800) 741-4337

Emergency State Warning Point:(800) 320-0519

Florida Small Business Assistance Program:(800) 722-7457

Pollution Prevention Information Clearinghouse:(202) 260-1023

Earth's 911 for Community Assistance:.....(800) 947-3873

Southern Waste Information Exchange (SWIX):(800) 441-7949

United States

Environmental Protection Agency

Region IV, Atlanta:(404) 562-9900

Small Business Assistance Ombudsman:(800) 368-5888

Waste Reduction Resource Center:(800) 476-8686

Education and Outreach:(800) 241-1754

RCRA/Superfund Hotline:(800) 424-9346

Occupational Safety and Health Administration (OSHA):(813) 626-1177

Recycling Hotline:(800) 947-3873

Publications

The following publications provide further information on waste reduction in fiberglass fabrication operations:

- ◆ EPA Guide To Pollution Prevention: *The Marine Maintenance and Repair Industry*, EPA/625/7-91/015, October 1991.
- ◆ EPA Guide To Pollution Prevention: *The Fiberglass-Reinforced and Composites Plastics Industry*, EPA/625/7-91/014, October 1991.
- ◆ *Pollution Reduction Strategies in the Fiberglass Boat Building and Open Mold Plastics Industries*, Darryl Davis, Department of Manufacturing at East Carolina University, 1987.

Fiberglass Fabrication Industry Trade Associations

Additional assistance and current technological information is also available through your industrial associations and various programs.

American Boat Builders and Repairers Association

715 Boylston Street
Boston, MA 02116

Fiberglass Fabrication Association

732 Eighth Street S.E. Suite 200
Washington, D.C. 20003

National Marine Manufacturers Association

401 N. Michigan Avenue
Chicago, IL 60611

Society of the Plastics Industry, Composites Institute

355 Lexington Avenue
New York, NY 10017

Composites Fabricators Association

1655 N. Fort Myer Drive, Suite 510Phone: (703) 525-0511
Arlington, VA 22209Fax: (703) 525-0743
<http://www.cfa-hq.org/>Email: cfa-info@cfa-hq.org

Internet Resources

Fiberglass World

Provides a directory of fiberglass associations and free fiberglass exchange program.<http://www.fiberglass.com/fiberglass/assn/index.html>

Pacific Northwest Pollution Prevention Resource Center

Provides various industry-related resources.

.....<http://www.pprc.org/pprc/sbap/fiber.html>

Minnesota Small Business Assistance Program for the Fiberglass Industry

Provides multi-media self-evaluation checklists for air quality, solid waste, hazardous wastes, fluorescent/HID lamps, spills, storage tanks, wastewater and stormwater.<http://www.pca.state.mn.us/programs/sbap-sectors.html>

Vendors

Mention of vendors does not constitute endorsement or recommendation for use by Pinellas County Environmental Management. Additional vendor information may be available in the local phone book yellow pages. The information is provided to you as a resource and is not intended to promote any one product or vendor. As the facility, you have the expertise to evaluate which product or alternative will best meet your production needs.

Resin Suppliers

Clear Cote Corporation(727) 822-4677
4242 31st Street North
St. Petersburg, FL

Fiberglass Coatings, Inc.(727) 327-8117
3201 28th Steet North
St. Petersburg, FL

International Epoxies and Sealers(727) 545-3223
6330 118th Avenue North
St. Petersburg, FL

Kardol(727) 522-1722
4400 34th Steet North
St. Petersburg, FL

Magnum Venus Products(727) 573-2955
1701 56th Court North
Clearwater, FL 33763

Reichhold.....(800) 448-3482
2400 Ellis Road
Durham, NC 27703

Equipment Suppliers (Process Equipment)

Bids Manufacturing Company.....(312) 671-3000
P.O. Box 66090
Chicago, IL 60666

DeVilbiss Ransburg(800) 338-4448 or (404) 696-4988
Southern Regional Sales
520-A Wharton Circle, South West
Atlanta, GA 30336

Glas-Craft(317) 875-5592
5845 West 82nd Street, Suite 102
Indianapolis, IN 46278

Grace, Inc.(800) 367-4023
P.O. Box 1441
Minneapolis, MN 55440

High Point Pneumatics.....(910) 889-8416
P.O. Box 5802
High Point, NC 27262-5802

Kremlin, Inc.(708) 543-1177
211 South Lombard
P.O. Box 1219
Addison, IL 60101

Magnum Venus Products(727) 573-2955
1701 56th Court North
Clearwater, FL 33763

Nordson Corporation(800) 241-8777
11475 Lakefield Drive
Duluth, GA 30136

Production Systems(919) 886-5081
P.O. Box 5406
High Point, NC 27262

Distillation/Solvent Recovery Equipment

Baron-Blakeslee(800) 548-4422
1500 West 16th Street
Long Beach, CA 90813

Brighton Custom Fabricating Division(513) 771-2400
11862 Mosteller Road
Cincinnati, OH 45241

C B Mills(800) 522-7343 or (708) 459-0007
Div. of Chicago Boiler Co.
5 Busch Parkway
Buffalo Grove, IL 60089-4517

Detrex Corporation(800) 959-0323, ext. 283
325-A Emmett Ave
Bowling Green, KY 42101

Hoffman Air & Filtration Systems.....(800) 258-8008 or (315) 437-0311
P.O. Box 548
6035 Corporate Drive
East Syracuse, NY 13057

Jan Engineering Co.(404) 292-1711
736 Indian Manor Court
Stone Mountain, GA 30083

Luwa HVAC Filters(704) 588-5220
P.O. Box 7263
Charlotte, NC 28241

Fiberglass-Reinforced Plastics/Composites

“Top 10” Pollution Prevention Opportunities provided by Washington State Department of Ecology, Hazardous Waste and Toxics Reduction Program.

Ancillary Systems1

- ◆ Install automated pumps or recirculation system
- ◆ Install bulk storage system
- ◆ Install monitors on spray systems to track use
- ◆ Install piping or feedlines
- ◆ Install ventilation system with filters and monitors
- ◆ Keep lids on composite drums

Finish Lines2

- ◆ Install high volume-low pressure (HVLP) gun
- ◆ Install electrostatic system
- ◆ Install gun cleaning tank/unit
- ◆ Use water-base coatings in place of organics

Operating Practices

- ◆ Improve customer knowledge of “environmentally-friendly” alternative products
- ◆ Improve housekeeping and maintenance
- ◆ Improve inventory controls and/or purchasing practices
- ◆ Improve production schedule to maximize process efficiency
- ◆ Improve tracking system to account for substance use and waste generation
- ◆ Improve worker training/awareness

Gel-coating or Laminating

Gun Application

- ◆ Install electrostatic system
- ◆ Install HVLP-chopper gun
- ◆ Install more-efficient gun tips

Engineering Controls

- ◆ Install gel-coat “set-up” timing equipment
- ◆ Reduce laminate thickness to engineered minimum
- ◆ Use heaters in production area to improve process efficiency and reduce styrene use

Process Applications

- ◆ Install flowcoater/chopper
- ◆ Install closed-mold system (resin transfer molding)
- ◆ Install impregnator system
- ◆ Install resin rollers
- ◆ Install vacuum-mold or infusion system (SCRIMP)
- ◆ Use ABS-backed acrylic sheet in place of fiber layup

Resin Alternatives

- ◆ Use low styrene resin in place of higher styrene resin
- ◆ Use heat to reduce viscosity in place of styrene monomer
- ◆ Use phenolic-based or furan-based resin in place of styrene resin
- ◆ Use UV-cured resin in place of higher styrene resin

- ◆ Use vapor-suppressed resin in place of higher styrene resin
- ◆ Use vinyl toluene resin in place of styrene resin

Tool & Equipment Clean-up

Use & Practice

- ◆ Allow solvent to become “dirtier” before recycling
- ◆ Install additional spray lines to reduce cleanout
- ◆ Install disposable liners in buckets
- ◆ Install funnel into bucket to catch acetone spray
- ◆ Install gun cleaning tank/unit
- ◆ Install two-bucket wash; one clean and one dirty
- ◆ Keep lids on soaking buckets
- ◆ Ration solvent or other material
- ◆ Reduce number of cleaning units/buckets
- ◆ Remove solid resin by hand prior to solvent wash
- ◆ Use disposable rollers or brushes

Solvent Alternatives

- ◆ Use citrus-base solvent in place of acetone
- ◆ Use diacetone alcohol in place of acetone
- ◆ Use dibasic acid ester in place of acetone
- ◆ Use emulsifier in place of acetone
- ◆ Use ethyl ethoxy propionate in place of acetone
- ◆ Use isopropanol in place of acetone

- ◆ Use propylene carbonate in place of acetone
- ◆ Use uncatalyzed resin in place of acetone to flush lines

Waste Management

- ◆ Decant and reuse spent solvent
- ◆ Grind and reuse still bottoms in “putty”
- ◆ Install on-site distillation unit
- ◆ Separate and reuse scrap fiberglass

1 - Ancillary systems include resin/gel-coat storage and delivery systems, air ventilation systems, and waste management systems.

2 - Finish lines include painting, mold making, upholstery, and foam manufacturing lines.

The P2R2 Program can provide additional resources regarding project funding, energy efficiency, product/equipment technology, and technical assistance. For information, contact our program at (727) 464-4761.

The P2R2 Section was developed to minimize the amount of liquid, solid, and gaseous pollution as well as energy and water consumption within Pinellas County.

If you are interested in the economic and environmental benefits of reducing wastes in your business, please contact the P2R2 Section at (727) 464-4761.



The **P2** Program's mission is to minimize the amount of liquid, solid and gaseous pollution as well as energy & water consumption within Pinellas County.



For any additional information, please contact the Pinellas County Department of Environmental Management Pollution Prevention and Resource Recovery Program at **(727) 464-4422**.

Pinellas County Department of Environmental Management

512 S. Ft. Harrison Avenue
Clearwater, FL 33756



www.pinellascounty.org



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Department of Environmental Management at:
(727) 464-4761/TDD (727) 464-4106