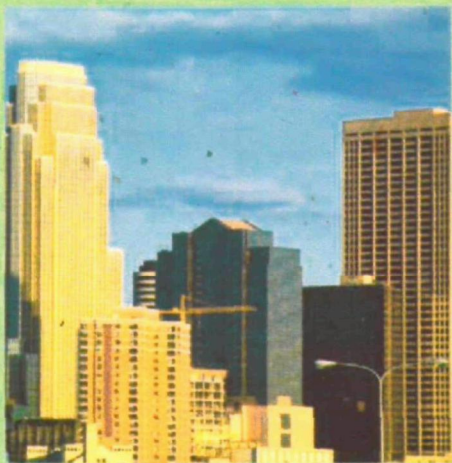


# HEALTHY AIR

A COMMUNITY AND BUSINESS LEADERS GUIDE



**HEALTHY AIR**  
A COMMUNITY AND BUSINESS LEADERS GUIDE



# HEALTHY AIR

A COMMUNITY AND BUSINESS LEADERS GUIDE





# Your Path to Healthy Air

## **What is *Healthy Air: A Community and Business Leaders Guide*?**

*Healthy Air: A Community and Business Leaders Guide* is a collection of non-regulatory, time-and-cost-saving ideas communities can use to reduce toxic air pollution.

Finding the sources of toxic air pollution in a community can be hard, and understanding the effects of toxic air pollution from all types of sources in a community can be even harder. For example, all of the businesses in an area may be doing an excellent job of meeting existing air quality requirements, and no individual business may be causing a problem. However, when all types and sources of air toxics are combined, they may result in a serious health or environmental risk for that community.

EPA, state, local, and Tribal air agencies, community groups, and businesses are trying to identify and address these risks at the community level. The *Healthy Air: A Community and Business Leaders Guide* is designed for just that purpose.

## **How does *Healthy Air: A Community and Business Leaders Guide* work?**

*Healthy Air: A Community and Business Leaders Guide* is a collection of information sheets about ways communities can work together to improve their air quality. It is designed to be used by community groups and their business partners as a planning guide. The guide contains:

- Reduction measures for different kinds of industrial, commercial, and household operations.
- Specific ways community groups can help.
- Separate information sheets for both owner/operators and other community members.
- Reference materials for additional information, including: contact information for local and Regional air agencies, trade associations, and resource centers.

Community groups and business operations that may be looking for ways to reduce toxic air pollution can use the information sheets to consider making specific changes. Businesses and consumers who make changes, such as using different processes or materials, can make significant improvements in local air quality. Many of these changes can also improve efficiency, cut costs, and save money.

**What emission sources are being developed for inclusion in the notebook?**

- Auto Body Shops
- Commercial Construction Operations
- Dry Cleaning Operations
- Electroplating Operations
- Fiberglass Fabrication Operations
- Hospitality Industry (Lodging Sector)
- Hospitals
- Metal Operations
- Nail Salons
- Paint and Coating Manufacturing
- Paint and Coating Stripping Operations
- Painting and Coating Operations
- Residential Wood Burning
- Shipbuilding and Repair Operations
- Wood Furniture Operations

**How will this material be distributed?**

The final version of *Healthy Air: A Community and Business Leaders Guide* will be available in the **Summer of 2005** and can be downloaded from the EPA Web site at **[www.epa.gov/....](http://www.epa.gov/....)** Hard copies of *Healthy Air: A Community and Business Leaders Guide* can be obtained from EPA's Office of Air Quality Planning and Standards library. You can request a copy by calling 919-541-5514 and asking for document number EPA-453/B-05/001.







## COMMUNITY INFORMATION SHEET

### Reducing Air Pollution from: Auto Body Shops

#### Could your family be affected?

About 287,000 tons of volatile organic compounds are emitted each year from the 50,000 auto body shops in the U.S.

— U.S. EPA

Switching from conventional to high-volume, low pressure (HVLP) spray guns and using proper spray techniques can save up to \$13,000 per year at a shop spraying 15 cars per week.

— U.S. EPA

EPA estimates that 20% of all volatile organic compound emissions from auto body shops occur during cleanup operations.

— U.S. EPA

#### Why do auto body shops need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Auto body shops repair, repaint, and customize cars, trucks, and other vehicles. Their activities include sanding, cleaning, and painting, all of which may release pollutants into the air and may contribute to health concerns in the shop and in the community.

The best auto body shops implement pollution prevention strategies not only to comply with federal, state, local and Tribal laws, but also to further minimize impacts on human health and the environment. Check with your state, local, or Tribal agencies for existing regulations.

#### What kinds of air pollutants may come from auto body shops?

- Auto body shop operations can produce emissions of toxic air pollutants, including metals and diisocyanates.
- Paints, cleaners, and paint strippers can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can also react in the air to form ground-level ozone (smog),

which has been linked to a number of respiratory effects.

- Lead, chromium, and cadmium are metals that form particle pollution during sanding and welding. Breathing particle pollution can cause respiratory problems and other harmful health effects.
- Diisocyanates are toxic air pollutants emitted during painting operations. These compounds are a leading cause of occupational asthma.

#### How can auto body shops reduce air pollution?

Making changes in shop work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, shops can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Substituting Materials

- Use less toxic materials. For example, use water-borne paints which minimize the need for cleaning solvents.
- Use alternative cleaners such as water-borne, alkaline, or microbial cleaners.

#### Training Operators in Skill and Safety

- Train technicians in proper spray application techniques to reduce emissions and enhance the quality of the paint finish.
- Training also will reduce worker exposure to toxic air pollutants.

*34 out of 40 Philadelphia shops made significant pollution reductions by identifying and using the best work practices, technologies, and cost factors for each.*

— U.S. EPA Design for the Environment



# COMMUNITY INFORMATION SHEET

## Auto Body Shops

### Replacing Equipment

- Replace old equipment with more efficient equipment, such as high-volume low-pressure (HVLV) spray guns, ventilated sanders, and enclosed cleaning systems that reduce solvent and paint emissions.

### As a community, what can you do to help reduce air pollution from auto body shops?

### Make Connections

- Get to know local auto body shop owners and operators because they know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- One idea is to form a work group that includes auto body shop owners and operators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can

provide help with analysis, technical information, equipment, and funding.

### Sponsor Training and Translation

- Improved skills lead to reduced paint usage and exposure for workers.
- Small shops may need funding in order to attend or provide training.
- For some ethnic minority groups, language may be a barrier. Sponsor translation of pollution prevention materials into languages commonly spoken by owners and employees.

### Reward Shops

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Present pollution prevention certificates to shops that reduce pollution.

### Be an Informed Consumer

- Patronize shops that implement pollution prevention strategies.
- Check with your insurance company to see if they know of shops that practice pollution prevention.

## For Further Information

- Automotive Service Association: [www.asashop.org](http://www.asashop.org), (800) 272-7467
- National Automobile Dealers Association, [www.nada.org](http://www.nada.org), (800) 252-6232
- Automotive Aftermarket Industry Association: [www.aftermarket.org](http://www.aftermarket.org), (301) 654-6664
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive](http://www.epa.gov/epahome/whereyoulive)
- Information specific to auto body shops: Best Practices and Outreach Kit, "Virtual Auto Body Shop" for cost calculations, equipment, technology & training information, access to sources of funding, and other assistance: [www.epa.gov/dfe/projects/auto](http://www.epa.gov/dfe/projects/auto)
- Painting techniques: Iowa Waste Reduction Center, 800-422-3109 and [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm)
- Toxicity of paints and solvents: Paint suppliers, Integrated Risk Information System (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- Training opportunities: Automotive trade associations
- Pollution prevention awards: State, local, and Tribal government agencies, universities, example: [www.deq.state.or.us/aq/Factsheets/04-NWR-009-EcoBizAuto.pdf](http://www.deq.state.or.us/aq/Factsheets/04-NWR-009-EcoBizAuto.pdf)
- Shops practicing pollution prevention: Auto insurance companies
- For more information, please see the Resources section of the Owner/Operator Information Sheet.





### Could your family be affected?

One shop installed a vacuum sanding system for \$9,000. Since installation, the shop has saved over \$7,000 a year because of reductions in cleanup costs.

— Peaks to Prairies Pollution  
Prevention Information  
Center

Switching from conventional to HVLP spray guns and using proper spray techniques can save up to \$13,000 per year at a shop spraying 15 cars a week.

— U.S. EPA Design for the  
Environment



## OWNER/OPERATOR INFORMATION SHEET

9/12/2005

### Reducing Air Pollution from: Auto Body Shops

#### Why should my auto body shop reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source. For example, using a professional laundry service to wash work clothes can reduce the chance of workers bringing potentially toxic particle pollution (dust) home to their families.

Pollution prevention practices also save money on waste disposal, paint and solvent usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, or Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

#### Why should I be concerned about air pollution from my auto body shop?

- Auto body shop operations can produce emissions of toxic air pollutants, including metals and diisocyanates.

- Paints, cleaners, and paint strippers can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.
- Lead, chromium, and cadmium are metals that form particle pollution during sanding and welding. Breathing particle pollution can cause respiratory problems and other harmful health effects.
- Diisocyanates are toxic air pollutants emitted during painting operations. These compounds are a leading cause of occupational asthma.

#### How can I reduce air pollution from my auto body shop?

##### Reduce the Use of Solvent Cleaners

- Use an enclosed solvent gun washing system to reduce evaporation when cleaning equipment. It can decrease costs by cutting the amount of solvent used for cleaning by more than 50%, the labor time by 60%, and air pollution by 70% to 90%.
- Turn off the parts cleaner when not in use. This reduces solvent evaporation.

*Average conventional spray gun cost: \$30 to \$40*

*Average HVLP gun cost: \$500*

*Average conventional gun transfer efficiency: 30% to 60%*

*Average HVLP gun transfer efficiency: 70%*

*Material savings when using HVLP gun: At least 30%*

— University of Nebraska Cooperative Extension



# OWNER/OPERATOR INFORMATION SHEET

## Auto Body Shops

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- Instead of cleaning with solvents, use a water-based cleaning system such as hot soap washers. These systems eliminate the costly purchase of chlorinated solvents. This can save up to 95% in operation costs. Make sure your local water system can treat the wastewater from this type of cleaning system.
- Recycle old solvent by using an on-site distillation unit. Reclaiming spent solvents on-site reduces the amount of solvent you send off-site for treatment and the amount of fresh solvent you have to buy.

### Reduce Paint Use

- Use high-volume low-pressure (HVLP) spray guns instead of conventional spray guns. These guns cost more than conventional spray guns, but using HVLP spray guns reduces labor time and product costs as well as pollution.
- Train technicians to use good spray application techniques to improve transfer efficiency. A higher transfer efficiency saves paint, leads to reduced application time, and decreases worker exposure to toxic air pollutants.
- Minimize waste and spills when mixing paint.
- Reduce vapors and waste by using air-tight containers. Open containers only when adding or pouring liquid.

### Use Less-Toxic Paints and Solvents

- If possible, use less-toxic, water-borne, or higher-solids paints. Switching to water-borne paints may require more preparation and drying time, but it minimizes the need for cleaning solvents.
- Choose solvents with low toxic air pollutant and VOC content. Use water-based, alkaline, or microbial cleaners.

### Minimize Dust From Sanding Operations

- Use a vacuum sander to collect dust during sanding operations. Vacuum sanders reduce exposure to toxic air pollutants and particle pollution; they also minimize dust settling onto freshly painted surfaces. For example, one Minnesota shop that installed a vacuum sander reduced the frequency of air filter changes and decreased the amount of sandpaper used.
- Leave work clothes and shoes at the shop. Have clothes cleaned by a professional laundering service.
- It's best not to eat or drink food left in the work area because particle pollution can contaminate these items. Also, do not smoke in the work area because

you may swallow dust through hand-to-mouth contact.

### Upgrade Your Shop's Equipment

- Several tools are available to assist you in determining whether you can upgrade the equipment in your shop. The Web site for one cost calculator is [www.iwrc.org/programs/calcs.cfm](http://www.iwrc.org/programs/calcs.cfm). This calculator enables you to determine whether it would be beneficial to upgrade to a HVLP spray gun, on-site distillation unit, or automatic gunwash system.
- If you decide to upgrade your shop's equipment, check with your state or local pollution prevention office for funding possibilities.

### Are HVLP spray guns really better?

Yes. HVLP guns are better if technicians are trained properly. Toxic air pollutant and VOC emissions released during a painting operation relate directly to the skill of the spray gun operator.

Properly used, HVLP spray guns often result in a higher transfer efficiency, reducing costs and worker exposure to toxic air pollutants.

### Where can I find out about training?

For training information, contact the Iowa Waste Reduction Center about their Spray Techniques and Analysis Research (STAR<sup>®</sup>) program, your local, state, or Tribal pollution prevention office, auto body trade associations, or spray equipment suppliers.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Also, sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.





### Could your family be affected?

By requiring employees to use an enclosed gun wash system and by monitoring the amount of lacquer thinner used, a shop in Colorado reduced the amount of solvent waste generated and saved \$3,600 per year in material and waste disposal costs.

— Colorado Department of  
Public Health and  
Environment Pollution  
Prevention Program

By switching from conventional to high volume low-pressure spray guns, one body shop reduced its paint usage by 30% per car.

— U.S. EPA Design for the  
Environment



## OWNER/OPERATOR INFORMATION SHEET

### Auto Body Shops

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## Resources

- Automotive Service Association: [www.asashop.org](http://www.asashop.org), (800) 272-7467
- National Automobile Dealers Association, [www.nada.org](http://www.nada.org), (800) 252-6232
- Automotive Aftermarket Industry Association: [www.aftermarket.org](http://www.aftermarket.org), (301) 654-6664
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Information specific to auto body shops: Best Practices and Outreach Kit, "Virtual auto body shop" for cost calculations, equipment, technology & training information, access to sources of funding, and other assistance: [www.epa.gov/dfe/projects/auto](http://www.epa.gov/dfe/projects/auto)
- Small Businesses: [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness)
- Calculator: [www.iwrc.org/programs/calcs.cfm](http://www.iwrc.org/programs/calcs.cfm)
- Iowa Waste Reduction Center STAR® Program: [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm), (800) 422-3109
- Pollution Prevention Opportunities for Autobody Shops : [www.peakstoprairies.org/topic/toc.cfm?hub=58&subsec=78&nav=7](http://www.peakstoprairies.org/topic/toc.cfm?hub=58&subsec=78&nav=7)
- Autobody Shop Waste Reduction and Management: [www.mntap.umn.edu/VEHICLE/28-CollRepair.htm](http://www.mntap.umn.edu/VEHICLE/28-CollRepair.htm)
- Pollution Prevention Opportunities for Automotive Repair Shops: [www.pprc.org/pprc/sbap/autorep/regfact.html](http://www.pprc.org/pprc/sbap/autorep/regfact.html)

### Toxicity of Paints and Solvents

- Paint suppliers
- Integrated Risk Information System (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)

*The EPA Design for Environment (DfE) conducted a pilot project with partner shops in the Philadelphia area to identify best practices and technologies, costs, and benefits. Recently, DfE tested the effectiveness of its hands-on approach in 40 Pennsylvania shops that volunteered to host a confidential site visit. As a direct result of these visits, more than 75% of the shops made environmentally beneficial changes.*

—U.S. EPA Design for the Environment





### Could your family be affected?

In the United States, about 70% of all dry cleaners use perchloroethylene, a known toxic air pollutant, as the cleaning solvent.

— International Fabricare Institute

The Cleaner Technologies Substitute Assessment for Professional Fabricare Processes is a technical report that presents relative risk, cost, and performance information on existing and new cleaning technologies.

— U.S. EPA Design for the Environment



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Dry Cleaning Operations

### Why do dry cleaning operations need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Dry cleaning operations offer garment cleaning services to consumers and commercial businesses. Their activities include cleaning, drying, stain removal, and finishing, all of which may release pollutants into the air and may contribute to health concerns in the shop and in the community.

The best dry cleaners implement pollution prevention strategies not only to comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from dry cleaning operations?

- The main source of air toxics from dry cleaners is the solvent used in the cleaning process. The most commonly used solvents are perchloroethylene and petroleum solvents.
- Perchloroethylene is a known toxic air pollutant. While federal, state, local, and Tribal regulations limit the amount of emissions from dry cleaners, dangerous releases of toxic air pollutants can occur if a dry cleaner does not operate in compliance with regulations.
- Petroleum solvents used in dry cleaning operations can release some

toxic air pollutants and volatile organic compounds (VOC).

Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

### How can dry cleaners reduce air pollution?

Making changes in dry cleaning work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, dry cleaners can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Lowering Emissions at the Source

- Minimize emissions through good work practices such as covering containers, preventing spills, and using closed solvent containers and delivery units.
- Maintain equipment to avoid excess leaks and evaporation.
- Use equipment properly.

#### Changing Technologies

- Change to technologies such as wet cleaning, liquid carbon dioxide, and silicone-based cleaning machines.
- Wet cleaning processes use water and natural soaps to clean clothes that typically require dry cleaning. Be aware that wet cleaning can result in increased labor time and can result in shrinkage for some fabrics.
- Liquid CO<sub>2</sub> cleaning technology eliminates cleaning with solvents.
- Silicone-based cleaning machines do not contain any toxic air pollutants or VOC and are odorless and affordable.



# COMMUNITY INFORMATION SHEET

## Dry Cleaning Operations

### As a community, what can you do to help reduce air pollution from dry cleaning operations?

#### Make Connections

- Get to know local dry cleaners because they know best about the materials and processes used in their businesses and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

#### Make a Plan

- One idea is to form a work group that includes local dry cleaners to develop and implement workable pollution reduction plans.

#### Locate Resources

- Use the "For Further Information" list below to find

governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

#### Sponsor Training and Translation

- Small shops may need funding in order to attend or provide training.
- Improved skills lead to less exposure for workers.
- Sponsor translation of pollution prevention materials to languages commonly spoken by owners and operators.

#### Reward Shops

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards or certificates may also increase business.

## For Further Information

- International Fabricare Institute: [www.ifi.org](http://www.ifi.org), (800) 638-2627
- International Dry Cleaners Congress: [www.idcnews.org](http://www.idcnews.org)
- Neighborhood Cleaners Association: [www.nca-i.com](http://www.nca-i.com)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- National Emission Standards for Hazardous Air Pollutants: Dry Cleaners: [www.epa.gov/ttn/atw/dryperc/dryclpg.html](http://www.epa.gov/ttn/atw/dryperc/dryclpg.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/wherelive.htm](http://www.epa.gov/epahome/wherelive.htm)
- Information specific to dry cleaners: U.S. EPA Design for the Environment: [www.epa.gov/dfe/projects/garment/index.htm](http://www.epa.gov/dfe/projects/garment/index.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- Toxicity of solvents: Integrated Risk Information System (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- Indiana 5-Star Environmental Recognition Program for Dry Cleaners: [www.in.gov/idem/ctap/cleaners/5stindex.html](http://www.in.gov/idem/ctap/cleaners/5stindex.html)
- For more information, please see the Resources section of the Owner/Operator Information Sheet.

*The Indiana 5-Star Environmental Recognition Program for Dry Cleaners is a voluntary program that ranks participating dry cleaners on a scale of 1 to 5 stars. The program recognizes those dry cleaners willing to do more for the environment and worker safety than the rules require. The Indiana Department of Environmental Management announces awards on a quarterly basis. Many shops have found this to be a very beneficial advertising and marketing tool.*

— Indiana Office of Pollution Prevention and Environmental Assistance





### Could your family be affected?

In the United States, about 70% of all dry cleaners use perchloroethylene, a known toxic air pollutant, as the cleaning solvent.

— International Fabricare Institute

A dry cleaner can reduce perchloroethylene use by 70% by converting from transfer equipment to a closed-loop dry-to-dry system. For a typical dry cleaner, this would result in a savings of about \$1,100 per year.

— Washington State Department of Ecology



## OWNER/OPERATOR INFORMATION SHEET

9/12/2005

# Reducing Air Pollution from: Dry Cleaning Operations

### Why should my dry cleaning operation prevent air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that reduce or eliminate air pollution at the source. For example, ensuring proper drying time minimizes air pollution.

Pollution prevention practices also save money on waste disposal, solvent usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from my dry cleaning operation?

- The main source of toxic air pollutants from dry cleaners is the solvent used in the cleaning process. The most commonly used solvents are perchloroethylene and petroleum solvents.
- Perchloroethylene is a known toxic air pollutant. While federal, state, local, and Tribal regulations limit the amount of emissions from dry

cleaners, dangerous releases of toxic air pollutants can occur if a dry cleaner does not operate in compliance with regulations.

- Petroleum solvents used in dry cleaning operations can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

### How can I reduce air pollution from my dry cleaning operation?

#### Lower Emissions at the Source

- Check hoses, couplings, pumps, valves, and gaskets frequently for leaks. Use a halogenated leak detector to help identify leaks. These detectors usually cost about \$250.
- Repair leaks promptly.
- Allow drying cycle to complete before opening the door. "Short cycling" reduces the effectiveness of solvent recovery equipment and increases fugitive emissions of solvents from the machine.
- Replace cartridge filters with spin disk filters that can be cleaned without opening.
- Cover containers of solvents to reduce solvent loss from evaporation and fugitive emissions of toxic air pollutants and VOC. This reduces worker exposure and releases of these pollutants to the outside air.
- Prevent spills by dispensing materials with spigots and pumps.

*An on-site distillation unit may recover as much as 90% of solvents used. This reduces solvent purchases and disposal costs.*

— U.S. EPA

# OWNER/OPERATOR INFORMATION SHEET

## Dry Cleaning Operations

9/12/2005

### Modify Processes

- Reduce process vent emissions by using a closed-loop dry-to-dry machine with a refrigerated condenser. The addition of a carbon adsorber can further reduce emissions by recovering solvents.
- Load the machine properly. Overloading reduces the effectiveness of solvent recovery equipment. Underloading makes less efficient use of the solvent.
- Recover solvents from filter cartridges by draining the filters for 24 hours in the filter housing to capture additional solvent before disposal.
- Install spill containment structures under and around your dry cleaning machine.
- Evaluate investment in a closed-loop dry-to-dry machine or other innovative cleaning technologies. Compare initial costs with savings, over time, in lower raw material and hazardous disposal costs.

### Recycle Materials

- Install equipment, such as refrigerated condensers, to recover solvent from the dry cleaning process.

### Change Technologies

- Change to technologies such as wet cleaning, liquid CO<sub>2</sub>, and silicone-based cleaning machines.
- Wet cleaning processes use water and detergent to clean clothes that typically require dry cleaning.
- Liquid CO<sub>2</sub> technology is non-toxic, non-combustible, and does not contribute to toxic air pollutant and VOC emissions.

- Silicone-based cleaning machines do not contain any toxic air pollutants or VOC and are odorless and affordable.

### Why should I consider changing processes?

Changing your dry cleaning process to upgrade equipment, or switching to alternative garment cleaning processes, can be relatively inexpensive and can result in cost savings and dramatic pollution reduction. Case studies show that replacing transfer equipment, or converting to closed-loop machines, can save up to 70% of your perchloroethylene use and pay back the investment in as little as 3 years.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.

*The Cleaner Technologies Substitute Assessment for Professional Fabricare Processes is a technical report that presents relative risk, cost, and performance information on existing and new cleaning technologies.*

— U.S. EPA Design for the Environment

*By switching to a petroleum-based dry cleaning machine, a Maine dry cleaner reduced its waste by 90% and its operating costs by \$10,000. Its solvent consumption dropped from 800 gallons per year to 200 gallons per year.*

— Maine Department of Environmental Protection





### Could your family be affected?

The Indiana 5-Star Environmental Program for Dry Cleaners is a voluntary program that ranks participating dry cleaners on a scale of one to five stars. The program recognizes those dry cleaners willing to do more for the environment and worker safety than the rules require. Many shops have found this to be a very beneficial advertising and marketing tool.

— Indiana Office of Pollution  
Prevention and Technical  
Assistance

A refrigerated condenser can reduce emissions from transfer machines by 85% and from dry-to-dry machines by 95%. Also, replacing transfer equipment or converting to closed-loop machines can reduce perchloroethylene use by up to 80% and pay back the investment in as little as 3 years.

— Hawaii Department of  
Health



## Resources

- International Fabricare Institute: [www.ifi.org](http://www.ifi.org), (800) 638-2627
- International Dry Cleaners Congress: [www.idcnews.org](http://www.idcnews.org)
- Neighborhood Cleaners Association: [www.nca-i.com](http://www.nca-i.com)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- National Emission Standards for Hazardous Air Pollutants: Dry Cleaners: [www.epa.gov/ttn/atw/dryperc/dryclpg.html](http://www.epa.gov/ttn/atw/dryperc/dryclpg.html)
- Dry Cleaning Industry Sector Notebook: [www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/dry.html](http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/dry.html)
- Indiana 5-Star Environmental Recognition Program for Dry Cleaners: [www.in.gov/idem/ctap/cleaners/5stindex.html](http://www.in.gov/idem/ctap/cleaners/5stindex.html)
- Fact sheet: [www.cdphe.state.co.us/el/Documents/DryClean/4DCFactSht.pdf](http://www.cdphe.state.co.us/el/Documents/DryClean/4DCFactSht.pdf)
- Dry Cleaning in the 90s: [www.iwrc.org/pubs/dc.pdf](http://www.iwrc.org/pubs/dc.pdf)
- Waste minimization: [www.state.hi.us/health/environmental/compliance/sb\\_library/drycleanwastemin.pdf](http://www.state.hi.us/health/environmental/compliance/sb_library/drycleanwastemin.pdf)

### U.S. EPA Design for the Environment

- Garment and Textile Care Partnership: [www.epa.gov/oppt/dfe/projects/garment/index.htm](http://www.epa.gov/oppt/dfe/projects/garment/index.htm)
- Case study: [www.epa.gov/oppt/dfe/pubs/garment/wsgc/wetclean.pdf](http://www.epa.gov/oppt/dfe/pubs/garment/wsgc/wetclean.pdf)
- Training curriculum: [www.epa.gov/oppt/dfe/pubs/garment/tech\\_rep/clothes.pdf](http://www.epa.gov/oppt/dfe/pubs/garment/tech_rep/clothes.pdf)

### Guides

- Pollution prevention guide: [www.dnrec.state.de.us/DREC/p2/DryClean.htm](http://www.dnrec.state.de.us/DREC/p2/DryClean.htm)
- Pollution Prevention Dry Cleaning Operations: Pinellas County Department of Environmental Management, Pinellas County, Florida: [www.pinellascounty.org/Environment/pagesHTML/PollutionPrevent/p2r2PDFs/mangmentPDFIndustry/DrycleanBooklet.pdf](http://www.pinellascounty.org/Environment/pagesHTML/PollutionPrevent/p2r2PDFs/mangmentPDFIndustry/DrycleanBooklet.pdf), 727-464-4761
- Dry Cleaning Guide: [www.ecy.wa.gov/pubs/0104018.pdf](http://www.ecy.wa.gov/pubs/0104018.pdf)
- Pressing Concerns: A Complete Guidebook to Environmental Compliance for Colorado Dry Cleaners: [www.cdphe.state.co.us/el/ecac/dcguide/Dry\\_Cleaner\\_Guidebook.html](http://www.cdphe.state.co.us/el/ecac/dcguide/Dry_Cleaner_Guidebook.html)
- A Guide for Perc Dry Cleaners: [www.state.hi.us/health/environmental/compliance/sb\\_library/dryclean\\_perc\\_guide.pdf](http://www.state.hi.us/health/environmental/compliance/sb_library/dryclean_perc_guide.pdf)

### Toxicity of Solvents

- Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/hapindex.html](http://www.epa.gov/ttn/hapindex.html)



Dry Cleaning



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Electroplating Operations

### Could your family be affected?

The Merit Partnership is a joint venture between U.S. EPA Region 9, state, and local regulatory agencies, private sector industries, and community representatives. The partnership was created to promote pollution prevention, identify pollution prevention technology needs, and accelerate pollution prevention technology transfer within various industries, including metal finishing.

The Merit Partnership Pollution Prevention Project for Metal Finishers involves implementing pollution prevention techniques and technologies at metal finishing facilities in southern California. Participants document and share their results. For more information, see the website under the "For Further Information" section.

— U.S. EPA



### Why do electroplating shops need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Electroplating is a type of metal finishing operation that changes the surface properties of a metal part to make it stronger, shinier, and corrosion-resistant. Activities at electroplating shops include surface preparation, surface treatment, and post-plating treatment, all of which may release pollutants into the air and may contribute to health concerns in the shop and in the community.

The best electroplating shops implement pollution prevention strategies not only to comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from electroplating shops?

- Electroplating operations can produce emissions of toxic air pollutants, including heavy metals and cyanide.
- Degreasing and cleaning solutions can release toxic air pollutants and volatile organic compounds (VOC).

*Switching to a water-based cleaning solution can reduce air emissions, reduce air permit fees, and create a more pleasant work environment.  
One company saved \$8,440 per year.*

Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

- Plating processes generate heavy metals such as hexavalent chromium and cadmium. While federal, state, local, and Tribal regulations limit the amount of emissions from electroplating shops, dangerous releases of toxic air pollutants can occur if an electroplating shop is not in compliance with regulations.
- Cyanide has been a key component of plating solutions for years. It can impact the nervous system, heart, and lungs.

### How can electroplating shops reduce air pollution?

Making changes in shop work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, shops can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Substituting Materials

- Use cleaners with low toxic air pollutant and VOC content.
- For chromium electroplaters, switch from hexavalent chromium solutions, which can cause cancer, to trivalent chromium ones, which do not.
- Replace cyanide in plating solutions with less toxic compounds like zinc chloride and pyro-phosphate copper.

— Kansas Small Business Environmental Assistance Program

# COMMUNITY INFORMATION SHEET

## Electroplating Operations

### Changing Cleaning Procedures

- Use cleaning procedures that reduce the amount of solvent needed.

### Recycling Materials

- Use an on-site distillation unit to recycle solvents.
- Use old solvent for cleaning very dirty parts.
- Reuse plating bath solution and rinse water.

### Changing Processes

- Use alternative metal deposition technologies to reduce or eliminate toxic air pollutant emissions.
- Reduce the chemical concentration of the plating bath without compromising quality.
- Use mechanical scraping instead of a chemical solution to remove buildup on the part.

### As a community, what can you do to help reduce air pollution from electroplating shops?

#### Make Connections

- Get to know local electroplating shop owners and operators because they know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- One idea is to form a work group that includes local owners and operators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

### Encourage Pollution Prevention

- Work with pollution prevention organizations to educate metal electroplating shop owners and operators about ways to prevent pollution.
- Help sponsor trade show exhibits and training workshops to show the latest pollution prevention technologies.

### Reward Shops

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards or certificates may also increase business.

## For Further Information

- National Association of Metal Finishers: [www.namf.org](http://www.namf.org), (407) 281-6445
- National Emission Standards for Hazardous Air Pollutants: Chromium Electroplating: [www.epa.gov/ttn/atw/chrome/chromepeg.html](http://www.epa.gov/ttn/atw/chrome/chromepeg.html)
- Community Information Sheet for Metal Operations.
- EPA's Sector Strategies Partnership Program for the Metal Finishing Sector: [www.epa.gov/sectors/metalfinishing/index.html](http://www.epa.gov/sectors/metalfinishing/index.html)
- Training opportunities: Local electroplating operations trade associations, area electroplating schools
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- Toxicity of Solvents: Integrated Risk Information Systems (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- Merit Partnership: [www.sectorstar.org/sector/MetalFinishing/showProgram.cfm?pid=130](http://www.sectorstar.org/sector/MetalFinishing/showProgram.cfm?pid=130)
- For more information, please see the Resources section of the Owner/Operator Information Sheet.





### Could your family be affected?

One electroplating shop switched from a vapor degreaser parts washing system that used solvents to a water-based power washing system. It saves approximately \$12,600 per year and has reduced toxic air emissions by 90%.

— Pollution Prevention Resource Center

One electroplating shop replaced their toxic cleaning solvent with a water-based solution. This completely eliminated toxic air emissions, reduced air permit fees, and created a more pleasant work environment.

Annual savings:  
\$8,440 per year

— Kansas Small Business Environmental Assistance Program

One firm used a low-concentration plating solution in 5 nickel tanks and saved \$1,300 in disposal and feedstock costs.

— U.S. EPA



## Reducing Air Pollution from: Electroplating Operations

### Why should my electroplating shop reduce air pollution?

People who are exposed to toxic air pollutant at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that reduce or eliminate air pollution at the source. For example, covering containers of cleaning solvents prevents vapors from affecting your employees.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from my electroplating shop?

- Electroplating operations can produce emissions of toxic air pollutants, including heavy metals and cyanide.
- Degreasing and cleaning solutions can release toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level

ozone (smog), which has been linked to a number of respiratory effects.

- Plating processes generate heavy metals such as hexavalent chromium and cadmium. While federal, state, local, and Tribal regulations limit the amount of emissions from electroplating shops, dangerous releases of toxic air pollutants can occur if an electroplating shop is not in compliance with regulations.
- Cyanide has been a key component of plating solutions for years. It can impact the nervous system, heart, and lungs.

### How can I reduce air pollution from my electroplating shop?

#### Substitute Materials

- Use cleaners such as water-based cleaners that have a lower toxic air pollutant and VOC content.
- Use degreasing solvents with a lower toxic air pollutants and VOC content.
- If you are a chromium electroplater, switch from hexavalent chromium-bearing solutions, which can cause cancer, to trivalent chromium ones, which do not cause cancer.
- Replace the cyanide in plating solutions with less toxic compounds like zinc chloride and pyro-phosphate copper.

#### Lower Emissions at the Source

- Cover containers of cleaning solvents and used shop towels. This will reduce emissions of toxic air pollutants and VOC as well as the

*EPA's Sector Strategies Program has an Environmental Management System (EMS) available for electroplating shops to use. An EMS helps electroplating shops integrate environmental decision making into day-to-day operations.*

— U.S. EPA



# OWNER/OPERATOR INFORMATION SHEET

## Electroplating Operations

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amount of solvent lost to evaporation. This reduces the amount of new solvent purchased.

- Securely cover all containers to reduce the chance of spills when transferring materials.
- Use funnels or pumps to avoid spills when dispensing materials.
- Install ventilation hoods over plating baths to help protect workers from evaporative plating solutions.

### Change Cleaning Procedures

- Mandate a "clean as you go" policy to reduce the amount of solvent needed for removing heavy build-up.
- Mechanically clean parts with a wire brush or sandblasting equipment to reduce solvent use.
- Use old solvent as a pre-wash or wipe for cleaning equipment or parts.
- Switch to a water-based cleaning system like ultrasonic cleaners, manual parts washers, automatic spray equipment, steam cleaners, or baths with agitation.
- Clean parts with hot water and detergent at high pressures in a pressurized washer.

### Recycle Materials

- Use an on-site distillation unit to clean dirty cleaning liquid. This makes the solvent available for reuse in the production process. An on-site distillation reduces the costs of both solvent disposal and fresh solvent purchase.
- Use old solvent for cleaning very dirty parts.
- Reuse plating bath solution and rinse water.
- Reduce bath dumps by continuously filtering bath solutions.

### Change Production Processes

- Review and streamline production processes to reduce overall cleaning solvent and degreaser use. For example, evaluate your solvent quality, consolidate parts washing processes, and service units only when necessary. These steps can greatly reduce solvent waste.
- Lower emissions of toxic air pollutants such as cyanide, chromium and other heavy metals by using

alternative electrocoating technologies like thermal spray coating, vapor deposition, and chemical vapor deposition.

- Minimize chemical usage and its associated emissions by using the lowest concentration of chemicals in the bath that will produce the desired results.
- If possible, use mechanical scraping instead of a chemical solution to remove undesired buildup on the metal.
- Change baths and rinses based on bath/rinse quality, not to meet an arbitrary schedule.

### What do I need to consider before converting to alternative plating processes?

Converting to alternative plating processes may result in high costs from research and development and new equipment, but these alternative processes often reduce operating costs.

Some alternative processes may be more labor intensive, which results in higher labor costs, but these processes can significantly reduce the amount of toxic air pollutants emitted.

Check with your state, local, or Tribal pollution prevention office for funding possibilities.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.



## Could your family be affected?

**One company uses active carbon filtration to regenerate plating baths.**

*Capital costs: \$9,192*

*Maintenance costs: \$7,973/yr*

**Reduction in plating bath disposal and fresh chemicals purchased: 47%**

*Savings from reduced waste disposal: \$67,420*

*Savings in chemical purchases: \$55,000*

— Illinois Waste Management and Research Center

*P2/Finance is a user-friendly series of free software programs designed to help business people analyze the costs of pollution prevention, energy efficiency, and other projects to enhance resource efficiency. It enables the user to compare costs/savings of business-as-usual practices with alternative scenarios.*

— Tellus Institute



# OWNER/OPERATOR INFORMATION SHEET

## Electroplating Operations

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## Resources

- National Association of Metal Finishers: [www.namf.org](http://www.namf.org), (407) 281-6445
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- National Emission Standards for Hazardous Air Pollutants: Chromium Electroplating: [www.epa.gov/ttn/atw/chrome/chrome.html](http://www.epa.gov/ttn/atw/chrome/chrome.html)
- Owner/Operator Information Sheet for Metal Operations.
- EPA's Sector Strategies Partnership Program for the Metal Finishing Sector: [www.epa.gov/sectors/metalfinishing/index.html](http://www.epa.gov/sectors/metalfinishing/index.html)
- Fabricated metal products sector notebook: [www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/fabmetn.pdf](http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/fabmetn.pdf)
- U.S. EPA Office of Research and Development Capsule Report: Approaching Zero Discharge in Surface Finishing. EPA 625/R-99/008, November 2000. Guidance on controls and process changes: [www.pfonline.com/mag\\_images/625R99008AZD.pdf](http://www.pfonline.com/mag_images/625R99008AZD.pdf)
- P2/Finance (Tellus Institute): [www.tellus.org/b&s/software/p2.html](http://www.tellus.org/b&s/software/p2.html)
- Electroplating and metal finishing: [www.cdphe.state.co.us/ap/P2/el\\_met.htm](http://www.cdphe.state.co.us/ap/P2/el_met.htm)
- Plating process: [www.wmrc.uiuc.edu/main\\_sections/info\\_services/library\\_docs/manuals/finishing/plating.htm](http://www.wmrc.uiuc.edu/main_sections/info_services/library_docs/manuals/finishing/plating.htm)
- Electroplating and metal finishing industry: [www.engext.ksu.edu/ppi/publications/manual/Metalfinish/contents.html](http://www.engext.ksu.edu/ppi/publications/manual/Metalfinish/contents.html)
- Options for industry: [www.dep.state.ct.us/wst/p2/industry/optindex.htm](http://www.dep.state.ct.us/wst/p2/industry/optindex.htm)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)

### Topic Hubs

- Metal fabrication and machining: [www.newmoa.org/prevention/topichub/toc.cfm?hub=23&subsec=7&nav=7](http://www.newmoa.org/prevention/topichub/toc.cfm?hub=23&subsec=7&nav=7)
- Machining and metal fabrication: [www.pprc.org/hubs/subsection.cfm?hub=23&subsec=4&nav=4](http://www.pprc.org/hubs/subsection.cfm?hub=23&subsec=4&nav=4)
- Plating: [www.pprc.org/hubs/subsection.cfm?hub=24&subsec=4&nav=4](http://www.pprc.org/hubs/subsection.cfm?hub=24&subsec=4&nav=4)

### Toxicity of Solvents

- Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)

### Alternatives

- Finding an Alternative to Solvent Degreasing: [www.pprc.org/cpc/Contents/Baseline/EPA%20Publications/Solvent%20Degreasing%20Alternatives.pdf](http://www.pprc.org/cpc/Contents/Baseline/EPA%20Publications/Solvent%20Degreasing%20Alternatives.pdf)
- Biochemical substitutions: [www.carbohydrateeconomy.org/library/admin/uploadedfiles/Biochemical\\_Substitution\\_in\\_the\\_Metal\\_Plating\\_.html](http://www.carbohydrateeconomy.org/library/admin/uploadedfiles/Biochemical_Substitution_in_the_Metal_Plating_.html)
- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)

## Electroplating Operations



### Could your family be affected?

A study in Minnesota showed a potential emission reduction of approximately 30% from implementing pollution prevention techniques at fiberglass fabrication facilities.

— Minnesota Office of Environmental Assistance

The Robert C. Byrd Institute for Advanced Flexible Manufacturing provides statewide and regional access to advanced technology and technical training for small and medium-sized manufacturers.

— Robert C. Byrd Institute



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Fiberglass Fabrication Operations

### Why do fiberglass fabrication operations need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Fiberglass fabrication operations produce many kinds of products, including tubs, showers, spas, car and truck accessories, boats, and storage bins. Activities at fiberglass fabrication operations include mold preparation, gel coating, laminating, equipment cleaning, systems operations, and finishing operations, all of which may release pollutants into the air and may contribute to health concerns in the operation and in the community.

The best fiberglass fabrication operations implement pollution prevention strategies not only to comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, or Tribal agencies for existing regulations.

### What kinds of air pollutants may come from fiberglass fabrication operations?

- Fiberglass fabrication operations can produce emissions of toxic air pollutants, including styrene.
- The primary pollutant at most operations is styrene, which is

present in resins and gel coats. A portion of the styrene evaporates during the curing process.

- Paints, thinners, solvents, and adhesives can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground level ozone (smog), which has been linked to a number of respiratory effects.

### How can fiberglass fabrication operations help reduce air pollution?

Making changes in operation work practices can stop pollutants at the source. By evaluating and improving these work practices, operations can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution are:

#### Improving System Design

- Improve production system design to minimize waste and exposure of resin to the air.
- Switch from manual operation to robotics to increase efficiency.
- Change to more efficient spray technologies.

#### Changing Raw Materials

- Use resins and gel coats that contain less styrene.
- Use vapor-suppressed or ultraviolet-cured resins.

#### Reducing Exposure to Solvent

- Cover solvent containers.
- Separate wastes to simplify solvent recycling.



# COMMUNITY INFORMATION SHEET

## Fiberglass Fabrication

### As a community, what can you do to help reduce air pollution from fiberglass fabrication operations?

#### Make Connections.

- Get to know local fiberglass fabrication operations because they know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

#### Make a Plan

- One idea is to form a work group that includes local owners and operators to develop and implement workable pollution reduction plans.

#### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

#### Encourage Pollution Prevention

- Encourage or sponsor training for employees of local fiberglass operations.

#### Reward Shops

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards or certificates may also increase business.

## For Further Information

- American Composites Manufacturers Association: [www.acmanet.org](http://www.acmanet.org), (703) 525-0511
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, or Tribal government agencies, universities
- Spray Training: American Composite Manufacturers Association: [www.acmanet.org/index.cfm](http://www.acmanet.org/index.cfm)
- Toxicity of Solvents: Integrated Risk Information Systems (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- Indiana Department of Environmental Management: [www.in.gov/idem/oppta/index.html](http://www.in.gov/idem/oppta/index.html)
- Robert C. Byrd Institute for Advanced Flexible Manufacturing: [www.rcbi.org](http://www.rcbi.org)
- For more information, please see the Resources section of the Owner/Operator Information Sheet.

#### National Emission Standards for Hazardous Air Pollutants

- Flexible Polyurethane Foam Production: [www.epa.gov/ttn/atw/foam/foampg.html](http://www.epa.gov/ttn/atw/foam/foampg.html)
- Flexible Polyurethane Foam Operations: [www.epa.gov/ttn/atw/foam2/foam2pg.html](http://www.epa.gov/ttn/atw/foam2/foam2pg.html)

*The Indiana Department of Environmental Management works with local small businesses to reduce pollution by providing experts for onsite technical assistance, economic advice, and other managerial advice.*

— Indiana Department of Environmental Management





### Could your family be affected?

Low-pressure spray techniques reduce misting and materials waste and can reduce emissions by 45%.

— Minnesota Office of  
Environmental  
Assistance



## OWNER/OPERATOR INFORMATION SHEET

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# Reducing Air Pollution from: Fiberglass Fabrication Operations

### Why should my fiberglass fabrication operation reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that reduce or eliminate air pollution at the source. For example, covering solvent containers prevents vapors from impacting your employees.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, or Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from my fiberglass fabrication operation?

- Fiberglass fabrication operations can produce emissions of toxic air pollutants, including styrene.
- The primary pollutant at most operations is styrene, which is present in resins and gel coats. A portion of the styrene evaporates during the curing process.
- Paints, thinners, solvents, and adhesives can release some toxic air

pollutants and volatile organic compounds (VOC). Chemicals in these substances can also react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

### How can I reduce air pollution from my fiberglass fabrication operation?

#### Improve Production System Design

- Switch from open to closed molds.
- Reduce time and waste by installing impregnator systems that combine resin and fiber application.
- Install resin rollers to eliminate waste and excessive resin use.
- Install vacuum-mold or infusion systems to eliminate air bubbles and improve product quality.
- Switch from manual operation to robotics. Robotic systems reduce production time and result in greater accuracy.
- Use computerized application technology to increase process efficiency.
- Switching production systems and investing in hardware and software for robotics and computer applications involves initial costs, but the payback period is generally less than 3 years.

#### Change Raw Materials

- Switch to resins and gel coats containing less styrene.
- Use ultraviolet-cured or vapor-suppressed resin. These resins have the potential to emit less styrene.

## Fiberglass Fabrication Operations

**Coordinate Equipment Design, Operation, and Use**

- Implement a controlled spray program that includes non-atomizing equipment such as flow coaters, pressure-fed rollers, and fluid impingement spray guns.
- Use wider mold flanges to reduce overspray.
- Calibrate the spray gun pressure to operate at the lowest effective level.
- Train operators to hold spray guns perpendicular to the surface. Training may result in savings in raw materials and labor costs.

**Change Spray Technologies**

- Change spray technologies from high-pressure to low-pressure sprays.
- Use non-atomized spray guns instead of atomized spray guns. This reduces both overspray and emissions.

**Reduce Exposure to Resin**

- Use efficient resin application methods, including non-atomized flow delivery. That saves time, uses up to 10% less materials and can reduce emissions up to 35%.
- Use low-cost closed molding technologies such as vacuum infusion or resin transfer molding. This eliminates the exposure of liquid resin to the environment during the manufacturing process.

**Reduce Exposure to Solvent**

- Reduce air emissions and prevent contamination by covering solvent containers.
- Separate wastes to simplify the recycling of solvents.

**How can preventing air pollution in my fiberglass fabrication operation save money?**

Preventing pollution saves money by using raw materials more efficiently, decreasing the risk of fires, and reducing the costs of spent solvent disposal.

Preventing pollution at a fiberglass fabrication operation could result in less time and money spent on:

- Ventilating work areas and filtration of air and solvents.
- Pollution control equipment.
- Sampling, monitoring and testing of materials found in the work place.
- Disposal of wastes and used solvents that may be hazardous or toxic.
- Purchase of raw materials.

**What else can I do to reduce air pollution?**

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.

*A boat manufacturer switched to more efficient spray guns (HVLP) and direct roller application of resins and reported a reduction in styrene levels of 85% and an annual cost savings of \$11,000.*

— Pacific Northwest Pollution Prevention Center





### Could your family be affected?

Reducing the amount of  
styrene in a resin by  
35% to 45% can result in  
an air emissions  
reduction of 20% to  
50%.

— Minnesota Technical  
Assistance Program



## OWNER/OPERATOR INFORMATION SHEET 9/12/2005

### Fiberglass Fabrication Operations

## Resources

- American Composites Manufacturers Association: [www.acmanet.org](http://www.acmanet.org), (703) 525-0511
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Production: [www.epa.gov/ttn/atw/foam/foampg.html](http://www.epa.gov/ttn/atw/foam/foampg.html)
- National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Operations: [www.epa.gov/ttn/atw/foam2/foam2pg.html](http://www.epa.gov/ttn/atw/foam2/foam2pg.html)
- Pollution prevention suggestions: [www.outreach.missouri.edu/polsol/fbrgls.htm#process](http://www.outreach.missouri.edu/polsol/fbrgls.htm#process)
- Technology transfer: [www.ecn.purdue.edu/CMTI/Technology\\_Transfer/](http://www.ecn.purdue.edu/CMTI/Technology_Transfer/)
- Fiberglass industry profile: [www.pprc.org/pprc/sbap/fiber/profile.cfm](http://www.pprc.org/pprc/sbap/fiber/profile.cfm)

### Pollution Prevention

- Overviews: [www.mntap.umn.edu/fiber/75-FRPeissions.htm](http://www.mntap.umn.edu/fiber/75-FRPeissions.htm),  
[www.moea.state.mn.us/publications/SIC3088.pdf](http://www.moea.state.mn.us/publications/SIC3088.pdf)
- Fact sheet: [www.eq.state.ut.us/EQSHW/ADOBE/p2factsheets/Fiberglassfct.pdf](http://www.eq.state.ut.us/EQSHW/ADOBE/p2factsheets/Fiberglassfct.pdf)

### Topic Hubs

- Pollution Prevention Resource Center: [www.pprc.org/hubs/toc.cfm?hub=10&subsec=7&nav=7](http://www.pprc.org/hubs/toc.cfm?hub=10&subsec=7&nav=7)
- Pollution Prevention Regional Information Center: [www.p2ric.org/topic hubs/toc.cfm?hub=10&subsec=7&nav=7&CFID=12373&CFTOKEN=99449821](http://www.p2ric.org/topic hubs/toc.cfm?hub=10&subsec=7&nav=7&CFID=12373&CFTOKEN=99449821)

### Guides

- Fiberglass operations: [www.ecy.wa.gov/programs/hwtr/P2/sectors/FRPGuide1.html](http://www.ecy.wa.gov/programs/hwtr/P2/sectors/FRPGuide1.html)
- Pollution prevention: [www.-2pays.org/ref/02/01058.pdf](http://www.-2pays.org/ref/02/01058.pdf)

### Toxicity of Solvents

- Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)

*A study in Minnesota showed a potential emission reduction of approximately 30% from implementing pollution prevention techniques at fiberglass fabrication facilities.*

— Minnesota Office of Environmental  
Assistance





### Could your family be affected?

EPA, along with Hospitals for a Healthy Environment, the American Hospitals Association, the American Nurses Association, and Health Care Without Harm, sponsors two awards that target mercury pollution.

— American Hospitals  
Association

After becoming aware of the presence of PVC within its neonatal units, one hospital system conducted a PVC audit and identified alternative materials for several of its devices.

— Health Care Without  
Harm



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Hospitals

### Why should hospitals reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Medical hospitals are facilities that engage in providing general medical, surgical, and specialty services. Equipment breakage and waste incineration may release pollutants into the air and may contribute to health concerns in hospitals and in the community.

Hospitals implement pollution prevention strategies not only to help comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from hospitals?

- Hospital operations can produce emissions of toxic air pollutants such as mercury and dioxin.

#### Mercury

- Mercury can be used in thermometers, blood pressure cuffs, thermostats, fluorescent lights, and other products found in hospitals.
- At room temperature, elemental mercury is a liquid and emits toxic vapors, which can be inhaled into the lungs and absorbed into the bloodstream.
- Mercury is very toxic to humans. It impacts the kidneys, liver, respiratory system, and central nervous system.

- When emitted indoors, mercury will eventually leak into the outdoor air through doors, ventilation systems, and other openings. It can also reach outdoor air through the incinerations of mercury-containing products.

#### Polyvinyl Chloride (PVC)

- PVC is used in plastic products such as IV bags, surgical tubing, other medical supplies, and construction materials.
- PVC is a source of toxic air pollutants when incinerated. Some hospitals incinerate their waste onsite.
- Dioxin is a potent carcinogen and interferes with normal reproduction and development at low doses.

### How can hospitals reduce air pollution?

Making changes in hospital operations can stop pollutants at the source and increase efficiency. By evaluating and improving work practices, hospitals can decrease emissions, reduce operational costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Replacing Sources of Mercury

- Use alternatives to mercury thermometers, mercury blood pressure cuffs, and other equipment.
- Switch to mercury-free preservatives.
- Insist on using recovered and recycled mercury in all products that do not yet have mercury-free alternatives.

#### Locating Sources of Mercury

- Use a mercury audit on a regular basis to locate sources of mercury.
- Formulate a plan to reduce sources of mercury.

# COMMUNITY INFORMATION SHEET

## Hospitals

### Communicating Mercury Dangers

- Develop a training and communication program.
- Train employees to look for ways to reduce mercury pollution.
- Develop and implement a protocol to prevent hospital employees from improperly disposing of mercury.

### Reducing PVC Use

- Conduct a PVC audit.
- Look for PVC-free products to replace PVC products.
- Use PVC-free medical devices, construction and furnishing products whenever possible.

### As a community, what can you do to help reduce air pollution from hospitals?

#### Make Connections

- Get to know local hospital administrators because they know best about the materials and procedures used in their hospitals and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

#### Make a Plan

- One idea is to form a work group that includes local hospital administrators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

### Lobby for Pollution Prevention Certification

- Help hospitals lobby societies such as the American Hospital Association to sponsor a certification for those who actively strive to reduce air emissions.

### Encourage a "Top Down" Pollution Prevention Approach

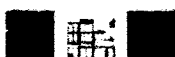
- Many hospitals are part of a larger hospital system that includes doctors' offices, outpatient clinics, and laboratories.
- Lobby hospitals to aggressively implement pollution prevention measures in all parts of its system.

### Help Hospitals Raise Mercury Awareness in the Surrounding Community

- Encourage hospitals to sponsor a "mercury turn-in" event in the surrounding community to collect mercury thermometers and batteries.
- This opportunity will allow them to inform the community about mercury dangers.
- Such an event will promote the hospital as a cooperative partner within the community.

## For Further Information

- Hospitals for a Healthy Environment: [www.h2e-online.org](http://www.h2e-online.org), (800) 727-4179
- Health Care Without Harm: [www.noharm.org](http://www.noharm.org), (703) 243-0056
- American Hospital Association: [www.hospitalconnect.com](http://www.hospitalconnect.com)
- American Nurses Association: [www.nursingworld.org](http://www.nursingworld.org), (800) 274-4262
- Sustainable Hospitals Project: [www.sustainablehospitals.org](http://www.sustainablehospitals.org), (978) 934-3386
- Healthcare Environmental Resource Center: [www.hercenter.org](http://www.hercenter.org)
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- Community-Based Projects: <http://www.epa.gov/air/toxicair/community.html>
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- For more information, please see the Resources section of the Owner/Operator Information Sheet.







## Could your family be affected?

A hospital system that instituted a mercury reduction program removed approximately 440 pounds of mercury from thermometers, blood pressure cuffs, and other equipment.

— U.S. EPA



## OPERATOR INFORMATION SHEET

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# Reducing Air Pollution from: Hospitals

### Why should my hospital reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, patients, and families by using materials, processes, or practices that reduce or eliminate air pollution at the source. For example, switching to mercury-free blood pressure cuffs reduces mercury emissions in case of accidental breakage.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing these pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from hospitals?

- Hospital operations can produce emissions of toxic air pollutants such as mercury and dioxin.

#### Mercury

- Mercury can be used in thermometers, blood pressure cuffs, thermostats, fluorescent lights, and other products found in hospitals.
- At room temperature, elemental mercury is a liquid and emits toxic vapors, which can be inhaled into the lungs and absorbed into the bloodstream.
- Mercury is very toxic to humans. It

impacts the kidneys, liver, respiratory system, and central nervous system.

- When emitted indoors, mercury will eventually leak into the outdoor air through doors, ventilation systems, and other openings. It can also reach outdoor air through the incineration of mercury-containing products.

#### Polyvinyl chloride (PVC)

- PVC is used in plastic products such as IV bags, surgical tubing, other medical supplies, and construction materials.
- PVC is a source of toxic air pollutants when incinerated. Some hospitals incinerate their waste onsite.
- Dioxin is a potent carcinogen and interferes with normal reproduction and development at low doses.

### How can I reduce air pollution from my hospital?

#### Replace Sources of Mercury

- Alternatives to mercury thermometers include electronic, infrared, chemical strip, and gallium, indium, and tin thermometers.
- Mercury blood pressure cuffs can be replaced by aneroid and electronic blood pressure cuffs.
- Use gastrointestinal tubes weighted with tungsten or water instead of mercury.
- Replace mercury pharmaceutical products with mercury-free preservatives.
- Identify why mercury is present as an active ingredient in laboratory chemicals. It may be possible to substitute a mercury-free alternative.

# OPERATOR INFORMATION SHEET

## Hospitals

9/12/2005

- Insist on mercury disclosures of all incoming products to the hospital.
- Insist on using recovered and recycled mercury in all products that do not yet have mercury-free alternatives.
- By reducing the amount of mercury used, you can minimize the costs associated with mercury collection, storage, recycling or disposal; paperwork for tracking hazardous waste disposal; and training for hospital employees who handle mercury-containing products or respond to spills. Reducing sources of mercury will also help you avoid increased regulation in the future.

### Locate Sources of Mercury

- Conduct a regular mercury audit to determine where mercury may be used.
- When forming a mercury audit team, use employees from all parts of the hospital. They have the best knowledge regarding where sources of mercury pollution may occur.
- Formulate a plan based on the results of the audit to reduce sources of mercury.

### Communicate Mercury Dangers

- Develop a training and communication program aimed at increasing the general awareness of mercury health impacts.
- Train employees to look for ways to reduce mercury pollution.
- Develop and implement a protocol to prevent hospital employees from any improper disposal of mercury.

### Develop a Mercury Housekeeping Program

- Ensure that equipment and operating procedures meet all standards for handling mercury. This helps avoid inadvertent mercury air emissions.
- Monitor and maintain the working condition of mercury-containing equipment. Label equipment.
- Establish procedures on how and where mercury may be used and disposed.
- Create and implement spill cleanup procedures for the recovery and cleanup of mercury spills.

- Recycle mercury whenever reducing the amount of mercury used is not feasible.

### What is a mercury “turn-in” program and how can it benefit my hospital?

A mercury “turn-in” program is an event sponsored by hospitals to receive mercury products that citizens may have in their homes such as mercury thermometers and batteries. The hospital then disposes of the mercury in a safe manner.

You can use this type of event as a community health initiative to inform your community of the dangers of mercury in the home. Also, mercury “turn-ins” can promote your hospital as an environmentally friendly hospital and a cooperative partner within the community.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested hospitals. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.

*A mercury-containing switch blew up at a hospital cafeteria in Michigan. The oven was damaged beyond repair.*

*Mercury clean-up cost: \$3,500.*

*Oven replacement cost: \$25,000*

— Wisconsin Department of Natural Resources



### Could your family be affected?

After becoming aware of the presence of PVC within its neonatal units, one hospital system conducted a PVC audit and identified alternative materials for several of its devices.

— Health Care Without Harm

## OPERATOR INFORMATION SHEET Hospitals

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### Resources

- Hospitals for a Healthy Environment: [www.h2e-online.org](http://www.h2e-online.org), (800) 727-4179
- Healthcare Environmental Resource Center: [www.hercenter.org](http://www.hercenter.org)
- Sustainable Hospitals Project: [www.sustainablehospitals.org](http://www.sustainablehospitals.org), (978) 934-3386
- Healthcare Without Harm: [www.noharm.org](http://www.noharm.org), (703) 243-0056
- American Hospital Association: [www.hospitalconnect.com](http://www.hospitalconnect.com)
- American Nurses Association: [www.nursingworld.org](http://www.nursingworld.org), (800) 274-4262
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)

#### Mercury

- General Guidelines: [www.epa.gov/seahome/mercury/src/guidels.htm](http://www.epa.gov/seahome/mercury/src/guidels.htm)
- Alternative Products: Alternative products: [www.p2pays.org/ref/01/00791.htm](http://www.p2pays.org/ref/01/00791.htm)
- Medical waste: [www.p2pays.org/ref/01/00792.htm](http://www.p2pays.org/ref/01/00792.htm)
- Fever thermometer information: [www.dep.state.pa.us/dep/deputate/pollprev/mercury/Mercury.pdf](http://www.dep.state.pa.us/dep/deputate/pollprev/mercury/Mercury.pdf)
- Indoor air quality: [www.newmoa.org/prevention/mercury/MercuryIndoor.pdf](http://www.newmoa.org/prevention/mercury/MercuryIndoor.pdf)
- Identification and reduction: [www.p2pays.org/ref/04/03851/hospital.pdf](http://www.p2pays.org/ref/04/03851/hospital.pdf)
- Emissions from healthcare incinerators: [www.dec.state.ny.us/website/ppu/merchosp.pdf](http://www.dec.state.ny.us/website/ppu/merchosp.pdf)

#### PVC

- PVC-free alternatives: [www.noharm.org/pvcDehp/pvcFree](http://www.noharm.org/pvcDehp/pvcFree)

*At one hospital, a mercury-containing blood pressure cuff broke on a carpeted surface. Clean-up cost: \$2,000*

*At another hospital, a mercury spill fell into tile crevices.*

*Clean-up time: 8 to 16 hours*

— U.S. EPA







### Could your family be affected?

EPA has found that indoor air can be more polluted than outdoor air. Since we spend over 90% of our time indoors, we risk inhaling more pollutants when we are guests at lodging properties than when we are outside.

— Green Seal

One hotel has posted their environmental program on their Web site ([www.habitatsuites.com](http://www.habitatsuites.com)).

— Habitat Suites,  
Austin, TX

Green Seal has initiated a certification program to help travelers, meeting planners, and government and corporate travel buyers identify environmentally responsible lodging properties.

— Green Seal



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: The Hospitality Industry (Lodging Sector)

### Why should lodging properties reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

The hospitality industry encompasses a wide range of services and activities such as lodging, restaurants, food services, and convention centers. The lodging sector consists of hotels, motels, resorts, and bed and breakfasts. Maintenance and operations activities within the lodging sector may release pollutants into the air and may contribute to health concerns at lodging properties and in the community.

The best lodging properties implement pollution prevention strategies not only to comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from lodging properties?

- Lodging properties can produce toxic air pollutants and ozone-depleting substances.
- Cleaning supplies, synthetic materials, paints, and pesticides can release toxic air pollutants and volatile organic compounds (VOC). Although emitted indoors, these air pollutants will also eventually leak into the outdoor air through doors, ventilation systems, and other openings. Once outside, the chemicals in these substances can

react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

- Ozone-depleting substances such as chlorofluorocarbons may be released by improperly maintained heating, ventilation, and air conditioning (HVAC) units, refrigeration units, and fire extinguishers.

### How can lodging properties reduce air pollution?

Making changes in how lodging properties maintain their facilities can stop pollutants at the source and improve indoor air quality. By evaluating and improving work practices, lodging properties can decrease emissions, reduce operating costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Changing Cleaners

- When possible, use non-toxic products. For example, instead of products with toxic ingredients to clean and polish furniture, use lemon oil.
- Purchase cleaners with low toxic air pollutant and VOC content.
- Choose pump-style sprays, which emit fewer toxic air pollutants and VOC.

#### Maintaining Buildings

- Use water-based, or other less toxic, paints and coatings.
- Regularly inspect floors to determine where the most wear occurs. Refinish only those portions.
- If available, use indoor furniture made of wood instead of pressed wood products, which can emit toxic air pollutants.

# COMMUNITY INFORMATION SHEET

## The Hospitality Industry (Lodging Sector)

### Controlling Ozone-Depleting Substance Emissions

- Use “good housekeeping” measures, such as checking for leaks in HVAC units and refrigeration systems, during equipment maintenance and operation.
- Recover and reuse ozone-depleting substances.
- At the end of equipment service life, replace with new and more efficient equipment that does not use ozone-depleting substances.
- Inspect halon-containing fire extinguishers frequently for leaks. Repair or replace faulty equipment.

### As a community, what can you do to help reduce air pollution from lodging properties?

#### Make Connections

- Get to know local lodging property managers because they know best about the materials and operations used in their businesses and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

#### Make a Plan

- One idea is to form a work group that includes local lodging owners and operators to develop and implement a workable pollution reduction plan.

### Locate Resources

- Use the “For Further Information” list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

### Encourage Lodging Properties to “Go Green.”

- A “green” lodging property is a property that is managed to be environmentally-friendly through a conscious effort to reduce pollution.
- Use media connections to provide coverage for successful efforts in reducing pollution. Positive publicity for successful “greening” efforts can mean increased business.
- Visibly displayed awards or certificates stating that the lodging property is a “green” property may also increase business.
- Motivate lodging property managers to become involved in “green” organizations for the hospitality industry such as Green Seal or the “Green” Hotels Association.

## For Further Information

- American Hotel and Lodging Association: [www.ahla.com](http://www.ahla.com), (202) 289-3100
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- “Green” Hotels Association (Information specific to lodging properties): [www.greenhotels.com](http://www.greenhotels.com), (713) 789-8889
- Green Seal: [www.greenseal.org](http://www.greenseal.org), (202) 872-6400
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- EPA Green Meetings Web Site: [www.epa.gov/oppt/greenmeetings/](http://www.epa.gov/oppt/greenmeetings/)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- For more information, please see the Resources section of the Owner/Operator Information Sheet.





### Could your family be affected?

At one hotel, a large chiller using CFC-12, a common ozone-depleting substance, serviced walk-in and under-the-counter coolers. Usually, retrofitting chillers requires changing the type of oil used. By substituting R-409a, a less ozone-depleting substance, no oil change was needed, and the life of the original equipment was extended. Also, R-409a costs less. Both of these factors led to a cost savings.

— United Nations  
OzonAction  
and Tourism  
Programmes



# Reducing Air Pollution from: The Hospitality Industry (Lodging Sector)

### Why should my lodging property reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from my lodging property?

- Lodging properties can produce toxic air pollutants and ozone-depleting substances.
- Cleaning supplies, synthetic materials, paints, and pesticides can release toxic air pollutants and volatile organic compounds (VOC). Although emitted indoors, these air pollutants will also eventually leak into the outdoor air through doors, ventilation systems, and other

openings. Once outside, the chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

- Ozone-depleting substances such as chlorofluorocarbons may be released by improperly maintained heating, ventilation, and air conditioning (HVAC) units, refrigeration units, and fire extinguishers.

### How can I reduce the air pollution from my lodging property?

#### Change Cleaners

- Choose non-toxic products such as baking soda, vinegar, and lemon oil.
- Purchase cleaners with less than 10 percent VOC by weight and those that have low toxic air pollutant content.
- Choose pump-style sprays instead of aerosols. These sprays emit fewer toxic air pollutants.
- Increase cleaning power of low toxic substances by combining, for example, baking soda and vinegar.

#### Building Maintenance Practices

- Use water-based, or other less toxic, paints and coatings to maintain floors and walls.
- Reduce the amount of refinishing needed for hardwood floors by regularly inspecting floors to determine where the most wear occurs. Refinish only those portions.

*"Being environmentally responsible really does increase the bottom line and guest satisfaction at knowing they are contributing to helping our planet. Business has increased 15%+ since 1994"*

— Janet Byrd, Director of Marketing/  
Environmental Programs at the Colony Hotel,  
Kennebunkport, Maine



# OWNER/OPERATOR INFORMATION SHEET

## The Hospitality Industry (Lodging Sector)

9/12/2005

- If possible, use indoor furniture made of wood instead of pressed wood products. If that isn't possible, then use pressed wood products that contain phenol resin instead of urea resin, which is more toxic.

### Control Emissions of Toxic Air Pollutants and Ozone-Depleting Substances

- Limit idling of tour buses around HVAC intake vents and entrances to prevent high concentrations of diesel vapors.
- Use "good housekeeping" measures, such as checking for leaks in piping, to avoid loss of ozone-depleting substances during HVAC unit and refrigeration equipment maintenance and operation.
- Recover and reuse ozone-depleting substances after dismantling HVAC and refrigeration equipment for service.
- Retrofit existing HVAC and refrigeration units to avoid leakage and loss of existing ozone-depleting substances.
- Phase out chemicals that deplete the ozone by retrofitting HVAC units and refrigerant units to use chemicals with a low, or zero, ozone-depleting substance content. There are financial benefits to phasing out these chemicals that help offset the expense of retrofitting. The cost savings will result from the prevention of chemical leakages and from the improved energy efficiency offered by many of the newer, zero-ozone-depleting substances and units.
- At the end of equipment service life, replace with new and more efficient equipment that does not use ozone-depleting substances.

### Reduce Ozone-Depleting Substance Emissions from Fire Extinguishers

- At the end of its service life, replace halon-containing fire extinguishers with alternative non-halon equipment.
- Inspect halon-containing fire extinguishers

frequently for leaks. Repair or replace if leaks are discovered.

### What is a "green" lodging property?

A "green" lodging property is a property that is managed to be environmentally-friendly, by making a conscious effort to reduce pollution. Many people prefer to stay at a hotel that follows "green" principles; this may result in increased income.

Being a "green" hotel, which includes improving air quality, tells the world that the environment is important to you.

Being a "green" hotel also raises the awareness of both your staff and guests about the need to be as environmentally-friendly as possible. When your guests learn about a hotel's environmental activities, they provide positive feedback, indicating increased customer satisfaction.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Also, sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.

*Green Seal has initiated a certification program to help travelers, meeting planners, and government and corporate travel buyers identify environmentally responsible lodging properties.*

— Green Seal





### Could your family be affected?

One hotel converted its fire extinguisher system to an "Inergen" system, a combination of nitrogen, argon, and carbon dioxide. This mixture is cheaper than halon, and these gases do not produce ozone-depleting substances.

— United Nations  
OzonAction and  
Tourism  
Programmes



## OWNER/OPERATOR INFORMATION SHEET 9/12/2005 The Hospitality Industry (Lodging Sector)

### Resources

- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- EPA Green Meetings Web Site: [www.epa.gov/oppt/greenmeetings/](http://www.epa.gov/oppt/greenmeetings/)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- "Green Hotels" program standards: [www.vtgreenhotels.org/downloads/GHstds.pdf](http://www.vtgreenhotels.org/downloads/GHstds.pdf)
- Protecting the ozone layer: [www.uneptie.org/ozonaction/library/tech/mmcfiles/1556-e.pdf](http://www.uneptie.org/ozonaction/library/tech/mmcfiles/1556-e.pdf)
- Success stories: [www.deq.state.va.us/p2/lodging/success.html](http://www.deq.state.va.us/p2/lodging/success.html)
- Environmental Practices Handbook: [www.habitatsuites.com/environmentalpracticeshandbook.pdf](http://www.habitatsuites.com/environmentalpracticeshandbook.pdf)
- Tourism and the environment: [www.dep.state.pa.us/depuate/pollpreve/Industry/hotels/default.htm](http://www.dep.state.pa.us/depuate/pollpreve/Industry/hotels/default.htm)
- Janitorial products: [www.wrppn.org/Janitorial/jp4.cfm](http://www.wrppn.org/Janitorial/jp4.cfm)
- Indoor air quality: [www.state.tn.us/environment/dca/p2/p2air-indoor.php](http://www.state.tn.us/environment/dca/p2/p2air-indoor.php)

### Organizations

- American Hotel and Lodging Association: [www.ahla.com](http://www.ahla.com), (202) 289-3100
- "Green" Hotels Association: [www.greenhotels.com](http://www.greenhotels.com), (713) 789-8889
- Green Seal: [www.greenseal.org](http://www.greenseal.org), (202) 872-6400

*One hotel uses naturally-scented, non-toxic, phosphate-free, biodegradable products. These include:*

*Vinegar: Cleans mirrors, windows, and metal fixtures*

*Baking soda: Cleans refrigerators and stoves*

*Vinegar and salt: Cleans metal*

*Tea tree oil and lemon oil: Polishes wood.*

— Habitat Suites, Austin, TX





## Could your family be affected?

The Pollution Prevention Assistance Division (P2AD) of the Georgia Department of Natural Resources provides pollution prevention assistance and training to companies that have metal operations. P2AD has also developed the Pollution Prevention Partners (P3) program as a means of getting companies involved in formalized pollution prevention.

— U.S. EPA

Targeted outreach is needed to meet the needs of small and mid-size companies.

Regional trade shows and conferences may be a good place for these companies to keep up with the latest technologies and meet vendors and government and university technical assistance providers.



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Metal Operations

### Why do metal operations need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Metal operations manufacture and finish metal parts ranging from paper clips to car bodies and spiral staircases. Activities at metal operations include metal fabrication, surface preparation, metal finishing, and other processes, all of which may release pollutants into the air and may contribute to health concerns in the shop and in the community.

The best metal operations implement pollution prevention strategies not only to help comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from metal operations?

- Metal operations can produce emissions of toxic air pollutants, including metals.
- Lubricants, degreasers, and cleaners can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can also react in the air to

form ground-level ozone (smog), which has been linked to a number of respiratory effects.

- Toxic air pollutants and particle pollution (dust) containing metals can result from the fumes generated by soldering or welding operations. While federal, state, local, and Tribal regulations limit the amount of emissions from metal operations, dangerous releases of toxic air pollutants can occur if a metal operation is not in compliance with regulations.

### How can metal operations reduce air pollution?

Making changes in operation work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, operations can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Substituting Materials

- Use cleaners with low toxic air pollutant and VOC content.
- Use metalworking fluids that are less volatile.

#### Changing Cleaning Procedures

- Use cleaning procedures that reduce the amount of solvent needed
- Collect and reuse old solvent.
- Reduce storage time between metalworking and finishing, to avoid using rust inhibitors.

*The Solvent Alternatives Guide (SAGE) is an online guide for solvent and process alternatives for cleaning equipment.*

— U.S. EPA

# COMMUNITY INFORMATION SHEET

## Metal Operations

### Changing Processes

- Install an induction furnace for metal casting. This will reduce particle pollution by 75%.
- Remove all paint and solvents from metals before welding, to avoid generating toxic fumes.
- Use welding materials and processes that reduce fumes.

**As a community, what can you do to help reduce air pollution from metal operations?**

### Make Connections

- Get to know local owners and operators. They know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- One idea is to form a work group that includes local metal operations owners and operators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

### Encourage Pollution Prevention

- Small metal operations may need funding in order to attend or provide training.
- Improved skills lead to reduced toxic air pollutant exposure for workers.
- Work with pollution prevention organizations to reach metal operators.
- Help sponsor trade show exhibits and training workshops to show the latest technologies.

### Reward Facilities

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards or certificates may also increase business.

## For Further Information

- National Association of Metal Finishers: [www.namf.org](http://www.namf.org), (407) 281-6445
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw](http://www.epa.gov/ttn/atw)
- EPA's Sector Strategies Partnership Program for the Metal Finishing Sector: [www.epa.gov/sectors/metalfinishing/index.html](http://www.epa.gov/sectors/metalfinishing/index.html), (202) 566-1961
- EPA's Sector Strategies Partnership Program for the Metal Casting Sector: [www.epa.gov/sectors/metalcasting/index.html](http://www.epa.gov/sectors/metalcasting/index.html), (202) 566-1407
- Community Information Sheet for Electroplating Operations
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- Training opportunities: Local metal operations trade association
- Solvent Alternatives Guide SAGE: [www.sage.rti.org](http://www.sage.rti.org)
- Toxicity of Solvents: Integrated Risk Information Systems (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- For more information, please see the Resources section of the Owner/Operator Information Sheet.



**Could your family  
be affected?**

***To clean metal parts,  
a company in Georgia  
used to immerse an  
industrial cloth in  
lacquer thinner and  
wipe the part clean.***

*Amount of lacquer  
thinner waste produced:  
15,632 pounds (39 55-  
gallon drums)*

**Hazardous materials  
disposal costs: \$3,900**

Then they changed  
cleaning processes,  
spraying the part with a  
citrus-based cleaner  
and wiping it clean, this  
method reduced  
lacquer thinner usage.

*Amount of lacquer  
thinner produced: 2,990  
pounds (7 drums)*

**Hazardous materials  
disposal costs: \$700**

— Georgia Department of  
Natural Resources



## OWNER/OPERATOR INFORMATION SHEET

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# Reducing Air Pollution from: Metal Operations

### Why should my metal operation reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source. For example, covering containers of cleaning solvents minimizes the amount of vapors that escape.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts further minimizes impacts on human health and the environment.

### Why should I be concerned about air pollution from my metal operation?

- Metal operations can produce emissions of toxic air pollutants, including metals.
- Lubricants, degreasers, and cleaners can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can also react in the air to form ground-level ozone (smog), which has been linked to a number of

respiratory effects.

- Toxic air pollutants and particle pollution (dust) containing metals can result from the fumes generated by soldering or welding operations. While federal, state, local, and Tribal regulations limit the amount of emissions from metal operations, dangerous releases of toxic air pollutants can occur if a metal operation is not in compliance with regulations.

### How can I reduce air pollution from my metal operation?

#### Substitute Materials

- Choose cleaners and degreasers such as waterborne cleaners that have a lower toxic air pollutant and VOC content.
- Use precoated or primed materials that do not require any additional lubrication.
- Use less volatile metalworking fluids to reduce vaporization in heat treating.

#### Lower Emissions at the Source

- Securely cover all containers to reduce the chance of spills when transferring materials.
- Use funnels or pumps to avoid spills when dispensing materials.
- Only open airtight containers when adding or dispensing liquids. This minimizes evaporative emissions and waste.
- Reduce the amount of time that the metal and metalworking fluids are exposed to the air during cleaning, melting, and die casting.

*A metal precision casting company switched to a citrus-based solvent for cleaning patterns used to make casting molds. This change reduced the company's air toxics emissions by over 18,000 pounds a year.*

— Pacific Northwest Pollution Prevention  
Center

# OWNER/OPERATOR INFORMATION SHEET

## Metal Operations

### Change Cleaning Procedures

- "Clean as you go" policies reduce the amount of solvent needed for removing heavy build-up.
- Use mechanical cleaning such as scraping or wiping before using solvents.
- Reuse cleaning solution or solvent. Use dirty solvent for initial cleaning, then follow with clean solvent.
- Switch to a water-based cleaning system like an ultrasonic cleaner, manual parts washers, automatic spray equipment, or baths with agitation.
- Reduce storage time between metalworking and finishing to offset the need for rust inhibiting oils.

### Recycle Materials

- Use an on-site distillation unit to clean dirty cleaning liquid. This makes the solvent available for reuse in the production process.
- In metal casting, collect and recycle the dust from furnaces and curing ovens by using pyrometallurgical treatment, rotary kiln, or other processes.
- Recycle oil, which does not need treatment before recycling, from cutting/machining operations.

### Change Processes

- Install an induction furnace for metal casting, which emits about 75 percent less particle pollution and vapors than other furnace types. An induction furnace does not require combustion gases or excessive metal temperatures.
- Centralize degreasing procedures to reduce and better track use of solvents.
- Remove all paint and solvents from the area to be welded to avoid generating toxic fumes during welding.
- Reduce the amount of fumes by using welding rods that produce a low fume and by using the least amount of heat and toxic welding material allowed by the manufacturer's manuals.

### Upgrade Your Equipment

- Check with your state, local, or Tribal pollution prevention office for funding possibilities.

### How does reducing solvent emissions save me money?

Using an on-site distillation unit reduces the amount of spent solvent sent off-site as well as the amount stored on-site as hazardous waste, reducing both the cost of solvent disposal and fresh solvent purchase.

Examine and streamline production processes to reduce overall cleaning solvent and degreaser use. For example, monitor solvent quality and consolidate parts washing processes. Service units only when the solvent quality dictates.

### How do I know what changes are best for my operation?

One way to include environmental decision-making into your daily business is to use an Environmental Management System (EMS) to help achieve continuous performance improvement. Metal finishers throughout the U.S. have found that using this plan-do-check-act approach creates a simple framework to examine ways your operation can affect the environment and tailor changes to meet your unique needs.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.

*EPA's Sector Strategies Program has Environmental Management Systems available for metal operations shops to use. An EMS helps metal operations shops integrate environmental decision making into day-to-day operations.*

— U.S. EPA





### Could your family be affected?

An aerospace manufacturer replaced 1,1,1-trichloroethane and methyl ethyl ketone cleaning solvent with non-toxic cleaner for hand-wiping operations.

Workers prefer this cleaner because it is more efficient and leaves less residue. The change reduced toxic emissions by thousands of pounds and saves \$250,000 per year.

— Pacific Northwest  
Pollution Prevent  
Resource Center

One shop used a stamping lubricant that can remain on the piece until the annealing process. This resulted in savings of \$12,000 from reduced disposal, raw material, and labor costs. Waste was reduced from 30,000 pounds in 1982 to 12,000 pounds in 1986. Working conditions also improved by removing vapors associated with the old cleaning process.

— U.S. EPA



## OWNER/OPERATOR INFORMATION SHEET Metal Operations

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### Resources

- National Association of Metal Finishers: [www.namf.org](http://www.namf.org), (407) 281-6445
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Owner Operator Information Sheet for Electroplating Operations
- Assessment and guidance: [www.ecy.wa.gov/pubs/99412.pdf](http://www.ecy.wa.gov/pubs/99412.pdf)
- Good operating practices: [dep.state.ct.us/wst/p2/industry/p2options.pdf](http://dep.state.ct.us/wst/p2/industry/p2options.pdf)
- Pollution prevention opportunities and impediments: [www.ganet.org/dnr/p2ad/pblcations/metal.html](http://www.ganet.org/dnr/p2ad/pblcations/metal.html)
- Biochemical Substitutions in the Metal Plating and Finishing Industry: [www.carbohydrateeconomy.org/library/admin/uploadedfiles/Biochemical\\_Substitutions\\_in\\_the\\_Metal\\_Plating.html](http://www.carbohydrateeconomy.org/library/admin/uploadedfiles/Biochemical_Substitutions_in_the_Metal_Plating.html)

#### EPA's Sector Strategies Partnership Program

- EPA's Sector Strategies Partnership Program for the Metal Finishing Sector: [www.epa.gov/sectors/metalfinishing/index.html](http://www.epa.gov/sectors/metalfinishing/index.html), (202) 566-1961
- EPA's Sector Strategies Partnership Program for the Metal Casting Sector: [www.epa.gov/sectors/metalcasting/index.html](http://www.epa.gov/sectors/metalcasting/index.html), (202) 566-1407

#### Environmental Management Systems

- Metal Finishing Sector: [www.epa.gov/sectors/metalfinishing/ems.html#ems](http://www.epa.gov/sectors/metalfinishing/ems.html#ems)
- Metal Casting Sector: [www.epa.gov/sectors/metalcasting/ems.html#diecastems](http://www.epa.gov/sectors/metalcasting/ems.html#diecastems)

#### Sector Notebooks

- Fabricated Metal Products Sector Notebook: [www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/fab\\_metsn.pdf](http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/fab_metsn.pdf)
- Metal Casting Industry Sector Notebook: [www.epa.gov/compliance/resources/publications/assurances/sectors/notebooks/met\\_cstsna.pdf](http://www.epa.gov/compliance/resources/publications/assurances/sectors/notebooks/met_cstsna.pdf)

#### Topic Hubs

- Pollution Prevention Resource Center: [www.pprc.org/hubs/toc.cfm?hub=24&subsec=7&nav=7](http://www.pprc.org/hubs/toc.cfm?hub=24&subsec=7&nav=7)
- Northeast Waste Management Officials' Association: [www.newmoa.org/prevention/topichub/toc.cfm?hub=23&subsec=7&nav=7](http://www.newmoa.org/prevention/topichub/toc.cfm?hub=23&subsec=7&nav=7)

#### Toxicity of Solvents

- Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)







## Could your family be affected?

Certain paints or coatings may contain as much as 40% volatile organic compounds (VOC). By reformulating the mixture to be low-VOC, air emissions of these pollutants may be reduced.

— National Paint and Coating Association

In one year, a paint manufacturer took back 44,000 gallons of unused paint from its customers and consumers and reworked it into new paint products.

— Valspar Corporation

One manufacturer recycles and reuses 95% of the solvent used in the cleanup process, which reduces emissions and the amount of solvent purchased.

— Pollution Solutions



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Paint and Coating Manufacturing

### Why should paint and coating manufacturing operations reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Paint and coating manufacturing operations produce paints, inks, adhesives, and a variety of other specialty coatings that preserve, protect, and decorate products. Activities such as mixing and cleaning operations may release pollutants into the air and cause health concerns in the community.

The best paint and coating manufacturing operations implement pollution prevention strategies not only to help comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from the manufacture of paints and coatings?

- Paint and coating manufacturing operations can produce hazardous air pollutants, including heavy metals.
- Mixing and cleaning operations can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.
- Pigment grinding and milling emits

particle pollution (dust), which can contain heavy metals and other toxic air pollutants. While federal, state, local, and Tribal regulations limit the amount of emissions from paint and coating manufacturing operations, dangerous releases of toxic air pollutants can occur if a paint and coating manufacturing operation is not in compliance with regulations.

### How can paint and coating manufacturers reduce air pollution?

Making changes in operation work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, operations can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Changing Products

- Eliminate the use of heavy metals like chromium and cadmium in paint pigments.
- Change coatings to reduce solvent content.

#### Changing Cleaning Procedures

- Use cleaning procedures that reduce the amount of solvent needed.
- Schedule product runs to minimize the amount of cleaning needed between colors or products.

#### Recycling and Reformulating

- Collect dust from pigment grinding operations for reuse.
- Rework or blend off-specification materials into new products.
- Set up or participate in a paint exchange program.

# COMMUNITY INFORMATION SHEET

## Paint and Coating Manufacturing

9/12/05

**As a community, what can you do to help reduce air pollution from paint and coating manufacturing operations?**

### Make Connections

- Get to know local paint and coating manufacturing operation owners and operators. They know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- One idea is to form a work group that includes local owners and operators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find

governmental and nonprofit contracts who can provide help with analysis, technical information, equipment, and funding.

### Reward Operations

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards or certificates may also increase business.

### Inform the Public

- Work with coating manufacturers to educate the public about reformulated paints.
- Users of reformulated coatings may require training to inform them that these coatings will have the same functionality as the coatings they replace.
- Emphasize reductions in toxic air pollutant emissions, safety hazards, and the use of potentially toxic solvents.

## For Further Information

- National Paint and Coatings Association: [www.paint.org](http://www.paint.org), (202) 462-6272
  - EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
  - EPA's Sector Strategies Partnership Program for the Paint and Coatings Sector: [www.epa.gov/sectors/paintcoatings/index.html](http://www.epa.gov/sectors/paintcoatings/index.html), (202) 566-2958
  - National Emission Standards for Hazardous Air Pollutants: Miscellaneous Coating Manufacturing: [www.epa.gov/ttn/atw/mcm/mcmppg.html](http://www.epa.gov/ttn/atw/mcm/mcmppg.html)
  - National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing and Miscellaneous Coating Manufacturing: [www.epa.gov/ttn/atw/mon/monpg.html](http://www.epa.gov/ttn/atw/mon/monpg.html)
  - Paints and Coatings Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
  - Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
  - Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
  - Pollution prevention awards: State, local, and Tribal government agencies, universities
  - Toxicity of materials: Materials suppliers, Integrated Risk Information System (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
  - Training opportunities: Paint and coatings manufacturing trade associations
  - Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
  - The Coatings Guide™: [www.cage.rti.org](http://www.cage.rti.org)
- For more information, please see the Resources section of the Owner/Operator Information Sheet.





### Could your family be affected?

One manufacturer successfully replaced lead pigments used for corrosion resistance with yttrium, which is 100 times safer as a dust than lead at typical levels of use. Use of yttrium in the coating also eliminates the need for a chrome pretreatment in the finishing process. Use of the yttrium coating should eliminate up to 1 million pounds of lead in this coating application over the next several years.

— PPG Industries



## OWNER/OPERATOR INFORMATION SHEET

9/12/2005

# Reducing Air Pollution from: Paint and Coating Manufacturing

### Why should my paint and coating manufacturing operation reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from paint and coating manufacturing operations?

- Paint and coating manufacturing operations can produce hazardous air pollutants, including heavy metals.
- Mixing and cleaning operations can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.
- Pigment grinding and milling emit

particle pollution (dust), which can contain heavy metals and other toxic air pollutants. While federal, state, local, and Tribal regulations limit the amount of emissions from paint and coating manufacturing operations, dangerous releases of toxic air pollutants can occur if a paint and coating manufacturing operation is not in compliance with regulations.

### How can I reduce air pollution from my paint and coating manufacturing operation?

#### Change Products

- Eliminate the use of heavy metals such as chromium, lead and mercury in coating mixtures. Non-hazardous biocides are available to replace mercury-containing coatings designed to kill bacteria.
- Reformulate coatings to higher solid coatings, waterborne coatings, powder coatings, or ultraviolet (UV) light-cured coatings.

#### Lower Emissions at the Source

- Cover tanks during blending, mixing, and while waiting to transfer the paint or coating into packaging.
- Cover tanks to reduce leakage of vapors.
- Cover all materials securely to reduce the chance of spills when transferring materials.

#### Change Cleaning Procedures

- Mandate a "clean as you go" policy to reduce the amount of solvent needed for removing heavy build-up.

*One manufacturer recycles and reuses 95% of the solvent used in the cleanup process, which reduces emissions and the amount of solvent purchased.*

— Pollution Solutions

# OWNER/OPERATOR INFORMATION SHEET

## Paint and Coating Manufacturing

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- Where tanks can be cleaned manually, use a wiper or squeegee rather than solvents.
- Use a high pressure spray hose to clean tanks. This reduces the amount of solvent needed.
- Reuse cleaning solution or solvent. For example, use dirty solvent for initial cleaning. Then follow with clean solvent.
- Use cleaners with low toxic air pollutant and VOC content, such as water-based cleaners.
- Dedicate equipment to a single product, or family of products that are similarly colored, to reduce the need for equipment cleaning between batches.

### Recycle and Reformulate Materials

- Reuse dust captured by a baghouse during pigment grinding.
- Set up, or participate in, a paint exchange program where customers return unused paint that can be reworked into future products.
- Rework or blend off-specification materials into new products.

### Reduce or Eliminate Toxic Emissions

- Reduce emissions of particle pollution by using a baghouse to collect dust.
- Use pigments in a slurry or paste instead of in dry form, to minimize dust.
- Grind or mix raw ingredients with sandmills instead of ballmills. Sandmills are more efficient and require less solvent for cleanup.

### Upgrading equipment and reformulating paint may be better, but how expensive is it?

Though reformulating coatings or using new or different processes may be more expensive, raw material costs may decrease. Also, these coatings reduce the amount of toxic air pollutants emitted at your operation as well as operations using the coatings.

If you decide to upgrade the equipment in your operation, check with your state, local, or Tribal pollution prevention office for funding possibilities.

### How can I inform my customers about reformulated paints?

Users of reformulated paints and coatings may not have used these types of paints before and may require training to inform them that these paints and coatings will have the same functionality as conventional

formulations.

Provide workshops and/or information about the advantages and disadvantages of reformulated paints and coatings. Emphasize reductions in toxic air pollutant emissions, safety hazards, and the use of potentially toxic solvents.

At your operation, institute management procedures and goals that require an evaluation of pollution prevention techniques before any products are formulated or re-formulated. Communicate to suppliers your commitment to your pollution prevention procedures and goals.

Also, sponsor or participate in a paint exchange program where customers can return paints to be reworked into other paints.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Refer your customers to Web sites for the Solvent Alternatives Guide ([www.sage.rti.org](http://www.sage.rti.org)) and The Coatings Guide™ ([www.cage.rti.org](http://www.cage.rti.org)) where they can increase their understanding of reformulated paints and coatings. Stay involved with trade associations and keep up to date with industry developments through industry-related Web sites.

Also, sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.



### Could your family be affected?

One paint manufacturer recycles and reuses 95% of the solvent used in the cleanup process. The company estimated that it generates \$9,600 annually in savings from reductions in waste generation and solvent consumption.

—The Carbohydrate  
Economy  
Clearinghouse

## OWNER/OPERATOR INFORMATION SHEET

### Paint and Coating Manufacturing

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## Resources

- National Paint and Coatings Association: [www.paint.org](http://www.paint.org), (202) 462-6272
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- EPA's Sector Strategies Partnership Program for the Paint and Coatings Sector: [www.epa.gov/sectors/paintcoatings/index.html](http://www.epa.gov/sectors/paintcoatings/index.html), (202) 566-2958
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
- Topic hub: [www.pprc.org/hubs/toc.cfm?hub=28&subsec=7&nav=7](http://www.pprc.org/hubs/toc.cfm?hub=28&subsec=7&nav=7)
- Assessment and guidance: [www.ecy.wa.gov/pubs/98410.pdf](http://www.ecy.wa.gov/pubs/98410.pdf)
- Good operating practices: [dep.state.ct.us/wst/p2/industry/optindex.htm](http://dep.state.ct.us/wst/p2/industry/optindex.htm)
- Special Chem: [www.paintandcoatings.com](http://www.paintandcoatings.com)

### National Emission Standards for Hazardous Air Pollutants

- Miscellaneous Coating Manufacturing: [www.epa.gov/ttn/atw/mcm/mcmpg.html](http://www.epa.gov/ttn/atw/mcm/mcmpg.html)
- Miscellaneous Organic Chemical Manufacturing and Miscellaneous Coating Manufacturing: [www.epa.gov/ttn/atw/mon/monpg.html](http://www.epa.gov/ttn/atw/mon/monpg.html)

### Alternatives

- Solvent Alternative Guide: [www.sage.rti.org](http://www.sage.rti.org)
- The Coatings Guide: [www.cage.rti.org](http://www.cage.rti.org)
- The Carbohydrate Economy: [www.carbohydrateconomy.org/library/admin/uploadedfiles/Biochemical\\_Substitutions\\_in\\_the\\_Paint\\_Industr.html](http://www.carbohydrateconomy.org/library/admin/uploadedfiles/Biochemical_Substitutions_in_the_Paint_Industr.html)

### Toxicity of Materials

- Materials suppliers
- Integrated Risk Information System (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)

*EPA's Sector Strategies Program works within the paint and coating manufacturing sector to assess opportunities for improving environmental performance while reducing regulatory burden.*

— U.S. EPA







## Could your family be affected?

EPA has developed an online pollution prevention tool for paints and coatings. Called The Coatings Guide™, this guide contains several tools to help users identify coatings with low VOC and hazardous air pollutant content that may be suitable for replacing existing paints or coatings.

— U.S. EPA

Spray Technique Analysis and Research (STAR®) training begins with an analysis of the spray technician's spraying technique through video footage. STAR® trainers introduce alternative spray techniques and equipment. The technician's performance before and after training is measured so that improvements are demonstrated.

— Iowa Waste Reduction Center



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Painting and Coating Operations

### Why do painting and coating operations need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Painting and coatings operations preserve, protect, and decorate many surfaces and products made from a variety of materials, including metal, wood, and plastics. Activities at painting and coating operations include glue and/or adhesive applications, paint or varnish application, and protective coating application, all of which may release pollutants into the air and may contribute to health concerns in the operation and in the community.

The best painting and coating operations implement pollution prevention strategies not only to help comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from painting and coating operations?

- Painting and coating operations can produce emissions of toxic air pollutants.
- Lubricants, degreasers, and cleaners can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of

respiratory effects.

- While federal, state, local, and Tribal regulations limit the amount of emissions from painting and coating operations, dangerous releases of toxic air pollutants can occur if a painting and coating operation is not in compliance with regulations.

### How can painting and coating operations help reduce air pollution?

Making changes in operation work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, operations can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Substituting Materials

- Use cleaners with low toxic air pollutant and VOC content.
- Use paint types with lower or no toxic air pollutants or VOC.

#### Changing Processes

- Change coating methods to ones that do not require spraying.
- Use enclosed or mechanical parts washing and gun washing systems.
- Reuse cleaning solution or solvent.
- Schedule color changes to minimize the amount of cleaning needed between colors.

#### Improving Spraying

- Train painters in proper spray application techniques to reduce emissions and enhance the quality of the paint finish.
- Replace old equipment with new and more efficient equipment, such as high-volume low-pressure (HVLP) spray, airless spray, air-assisted airless spray or electrostatic spray guns.



# COMMUNITY INFORMATION SHEET

## Painting and Coating Operations

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### Lowering Emissions at the Source

- Open containers only when adding or dispensing materials.
- Use wet and dry filters in a spray booth to capture and control particulate emissions.

**As a community, what can you do to help reduce air pollution from painting and coating operations?**

### Make Connections

- Get to know local painting and coating operation owners and operators. They know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- One idea is to form a work group that includes local painting and coating operations to develop and

implement workable pollution reduction plans.

### Locate Resources

- Use the “For Further Information” list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

### Sponsor Training and Translation

- Small operations may need funding in order to attend or provide training.
- Improved skills lead to reduced paint usage and exposure for workers.

### Reward Operations

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards and certificates may also increase business.

## For Further Information

- National Paint and Coatings Association: [www.paint.org](http://www.paint.org), (202) 462-6272
- EPA’s Sector Strategies Partnership Program for the Paint and Coating Sector: [www.epa.gov/sectors/paintcoatings/index.html](http://www.epa.gov/sectors/paintcoatings/index.html), (202) 566-2958
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- Toxicity of paints and solvents: Paint or coating suppliers, Integrated Risk Information System (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- Training opportunities: Trade associations for painters and coaters.
- STAR® Painting Techniques: Iowa Waste Reduction Center: [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm), (800) 422-3109
- Paints and Coatings Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
- The Coatings Guide™: [www.cage.rti.org](http://www.cage.rti.org)
- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- For more information, please see the Resources section of the Owner/Operator Information Sheet.

### National Emission Standards for Hazardous Air Pollutants

- Auto and Light-Duty Truck Surface Coating Operations: [www.epa.gov/ttn/atw/auto/autopg.html](http://www.epa.gov/ttn/atw/auto/autopg.html)
- Large Appliance Surface Coating Operations: [www.epa.gov/ttn/atw/lapp/lapplpg.html](http://www.epa.gov/ttn/atw/lapp/lapplpg.html)
- Magnetic Tape Manufacturing: [www.epa.gov/ttn/atw/magtape/magtappg.html](http://www.epa.gov/ttn/atw/magtape/magtappg.html)
- Metal Can Surface Coating Operations: [www.epa.gov/ttn/atw/mcan/mcanpg.html](http://www.epa.gov/ttn/atw/mcan/mcanpg.html)
- Metal Coil Surface Coating Operations: [www.epa.gov/ttn/atw/mcoil/mcoilpg.html](http://www.epa.gov/ttn/atw/mcoil/mcoilpg.html)
- Miscellaneous Metal Parts and Products Surface Coating Operations: [www.epa.gov/ttn/atw/misc/miscpg.html](http://www.epa.gov/ttn/atw/misc/miscpg.html)
- Paper and Other Web Surface Coating Operations: [www.epa.gov/ttn/atw/powc/powcpg.html](http://www.epa.gov/ttn/atw/powc/powcpg.html)
- Surface Coating of Plastic Parts and Products: [www.epa.gov/ttn/atw/plastic/plasticpg.html](http://www.epa.gov/ttn/atw/plastic/plasticpg.html)
- Wood Building Products Surface Coating Operations: [www.epa.gov/ttn/atw/wbldg/wbldgpg.html](http://www.epa.gov/ttn/atw/wbldg/wbldgpg.html)



## Could your family be affected?

One company substituted higher-solids paints for conventional solvent-borne coatings, which resulted in increased transfer efficiency and a 30% decrease in VOC emissions and paint wastes. Also, the company saved \$28,000 in paint purchases and paint disposal costs.

— North Carolina Division of Pollution Prevention and Environmental Assistance

The Coatings Guide™ is an online pollution prevention tool for paints and coatings.

This guide contains several tools to identify low-VOC and/or low toxic air pollutant content coatings that may be suitable replacements.

— U.S. EPA



## OWNER/OPERATOR INFORMATION SHEET

9.12.2005

# Reducing Air Pollution from: Painting and Coating Operations

## Why should my painting and coating operation reduce air pollution?

People who are exposed to air toxics at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts further minimizes the impacts on human health and the environment.

## Why should I be concerned about air pollution from my painting and coating operation?

- Painting and coating operations can produce emissions of toxic air pollutants.
- Lubricants, degreasers, and cleaners can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.
- While federal, state, local, and Tribal regulations limit the amount of emissions from painting and coating operations, dangerous releases of toxic air pollutants can occur if a

painting and coating operation is not in compliance with regulations.

## How can I reduce air pollution from my painting and coating operation?

### Substitute Materials

- Use cleaners with low toxic air pollutants and VOC such as water-based, alkaline, or microbial cleaners. These can reduce air pollutant emissions up to 90%.
- Use paint types such as waterborne paints, powder coatings, ultraviolet (UV) light or electron beam-curable coatings, or higher-solids paints.

### Change Processes

- Minimize the need for cleaning solvents by using waterborne paints.
- Use a coating method that does not require spraying such as electrodeposition, dip coating, roller coating, or flow coating.

### Improve Spraying

- Use more efficient paint application equipment to reduce overspray such as switching to a high-volume, low-pressure spray (HVLP), airless spray, air-assisted airless spray, or electrostatic spray guns.
- Train painters in proper spray application techniques. Proper training, which includes information on gun position, motion, triggering, and overlap, can reduce air pollutant emissions and enhance the quality of the paint finish.
- Minimizing overspray results in less labor and product used and fewer air pollutants generated.

# OWNER/OPERATOR INFORMATION SHEET

## Painting and Coating Operations

9/12/2005

### Lower Emissions at the Source

- Open containers only when adding or dispensing materials. This minimizes evaporative emissions and waste.
- Use air-tight containers to store solvents, paints, and other coatings.
- Use a spray booth to capture and control emissions.

### Change Cleaning Procedures

- Use enclosed or mechanical parts and gun washing systems to reduce evaporative emissions.
- Monitor the amount of cleaning solvent used during cleanup to avoid excess usage.
- Reuse cleaning solution or solvent. Use dirty solvent for initial cleaning, then follow with clean solvent.
- Schedule color changes to minimize cleaning needed between colors. Paint products with light colors and then follow with increasingly darker colors.

### Upgrade Your Operation's Equipment

- Check with your state, local, or Tribal pollution prevention office for funding possibilities.

### Are HVLP spray guns really better? Where can I find out about training?

HVLP guns are better than conventional atomized air spray guns if technicians are trained properly. VOC emissions released during a painting operation are directly related to the skill of the spray gun operator.

Properly used HVLP spray guns often result in a higher transfer efficiency, which results in reduced overspray.

Reduced overspray minimizes costs and worker exposure to toxic emissions.

Information about training may be found at

- Iowa Waste Reduction Center: [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm) or call 1-800-422-3109.
- State, local, or Tribal pollution prevention offices.
- Spray equipment suppliers.
- Trade associations for painting and coating operations.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Refer your customers to Web sites for the Solvent Alternatives Guide ([www.sage.rti.org](http://www.sage.rti.org)) and The Coatings Guide™ ([www.cage.rti.org](http://www.cage.rti.org)) where they can increase their understanding of alternative paints and coatings. Stay involved with trade associations and keep up to date with industry developments through industry-related Web sites.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.

*EPA's Sector Strategies Program works within the painting and coating operations sector to assess opportunities for improving environmental performance while reducing regulatory burden.*

— U.S. EPA



### Could your family be affected?

The cost of on-site  
distillation units depends  
on size.

2-gallon still: \$2,100  
3.5-gallon still: \$3,000  
5-gallon still: \$4,000  
7.5-gallon still: \$4,700  
15-gallon still: \$8,500

These prices do not  
include vacuum assist  
costs.

— Iowa Waste Reduction  
Center

In a conventional spray  
painting process, as  
much as 70% or more of  
the paint may miss its  
target surface. Using  
more efficient application  
methods can substantially  
reduce that amount.

— Ohio  
Environmental Protection



## OWNER/OPERATOR INFORMATION SHEET Painting and Coating Operations

9/12/2005

### Resources

- National Paint and Coatings Association: [www.paint.org](http://www.paint.org), (202) 462-6272
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- EPA's Sector Strategies Partnership Program for the Paint and Coating Sector: [www.epa.gov/sectors/paintcoatings/index.html](http://www.epa.gov/sectors/paintcoatings/index.html), (202) 566-2958
- Paints and Coatings Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
- Iowa Waste and Reduction Center STAR<sup>®</sup> Training: [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm), (800) 422-3109
- Spray painting options: [www.wmrc.uiuc.edu/main\\_sections/info\\_services/library\\_docs/TN/98-048.pdf](http://www.wmrc.uiuc.edu/main_sections/info_services/library_docs/TN/98-048.pdf)
- Painting and coating operations: [www.epa.state.oh.us/opp/paints/fact23.html](http://www.epa.state.oh.us/opp/paints/fact23.html)
- Good operating practices: [www.dep.state.ct.us/wst/p2/industry/optindex.htm](http://www.dep.state.ct.us/wst/p2/industry/optindex.htm)

#### National Emission Standards for Hazardous Air Pollutants

- Auto and Light-Duty Truck Surface Coating Operations: [www.epa.gov/ttn/atw/auto/autopg.html](http://www.epa.gov/ttn/atw/auto/autopg.html)
- Large Appliance Surface Coating Operations: [www.epa.gov/ttn/atw/lapp/lapplpg.html](http://www.epa.gov/ttn/atw/lapp/lapplpg.html)
- Magnetic Tape Manufacturing: [www.epa.gov/ttn/atw/magtape/magtappg.html](http://www.epa.gov/ttn/atw/magtape/magtappg.html)
- Metal Can Surface Coating Operations: [www.epa.gov/ttn/atw/mcan/mcanpg.html](http://www.epa.gov/ttn/atw/mcan/mcanpg.html)
- Metal Coil Surface Coating Operations: [www.epa.gov/ttn/atw/mcoil/mcoilpg.html](http://www.epa.gov/ttn/atw/mcoil/mcoilpg.html)
- Miscellaneous Metal Parts and Products Surface Coating Operations: [www.epa.gov/ttn/atw/misc/miscpg.html](http://www.epa.gov/ttn/atw/misc/miscpg.html)
- Paper and Other Web Surface Coating Operations: [www.epa.gov/ttn/atw/powc/powcpg.html](http://www.epa.gov/ttn/atw/powc/powcpg.html)
- Surface Coating of Plastic Parts and Products: [www.epa.gov/ttn/atw/plastic/plasticpg.html](http://www.epa.gov/ttn/atw/plastic/plasticpg.html)
- Wood Building Products Surface Coating Operations: [www.epa.gov/ttn/atw/wbldg/wbldgpg.html](http://www.epa.gov/ttn/atw/wbldg/wbldgpg.html)

#### Alternatives

- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- The Coatings Guide<sup>™</sup>: [www.cage.rti.org](http://www.cage.rti.org)
- Biochemical solvents: [www.carbohydrateconomy.org/library/admin/uploadedfiles/Biochemical\\_Solvents\\_for\\_Pollution\\_Prevention.html](http://www.carbohydrateconomy.org/library/admin/uploadedfiles/Biochemical_Solvents_for_Pollution_Prevention.html)

#### Toxicity of Solvents

- Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)





## Could your family be affected?

Finding alternatives to chemical paint strippers can result in an improved working environment, health, and safety for workers, reduced regulatory compliance burden, savings on materials and disposal cost, and marketing advantages as an "environmentally friendly" business.

— Minnesota Technical Assistance Program

95 percent of all paint stripper used by the consumer is for stripping furniture.

— Source Reduction Research Partnership



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Paint and Coating Stripping Operations

### Why do paint and coating stripping operations need to reduce air pollution?

People who are exposed to air toxics at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that can reduce or eliminate air pollution at the source.

Paint and coating stripping operations strip paints and coatings from surfaces of metal and wood furniture and parts. Paint and coating removal may be needed either as part of the manufacturing process or to allow for maintenance or repair operations.

The best paint and coating removal operations implement pollution prevention strategies not only to help comply with federal, state, local, and Tribal laws, but also to go beyond compliance and further minimize impacts on human health, the environment and costs. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from paint and coating stripping operations?

- Solvents in chemical paint strippers can release volatile organic compounds (VOC) and some toxic air pollutants. Chemicals in these substances can also react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.
- Methylene chloride is found in many chemical paint strippers. While federal, state, local, and Tribal regulations limit the amount of emissions from paint and coating stripping operations, dangerous

releases of methylene chloride can occur if a paint and coating stripping operation is not in compliance with regulations.

- Lead, chromium and cadmium are metals that may be generated as particle pollution (dust) during abrasive paint removal or mechanical paint stripping. Breathing dust can cause respiratory problems and other harmful health effects.

### How can paint and coating stripping operations reduce air pollution?

Making changes in operation work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, operations can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

### Evaluating Painting and Coating Processes

- Investigate how painting or coating processes can be improved, so surfaces will not need to be stripped and repainted.

### Using Alternatives to Chemical Stripping

- Consider using abrasives, with proper particle pollution controls, to remove paint.
- Investigate thermal or cryogenic stripping techniques.
- Use paint strippers that do not contain chemicals that produce toxic air pollutants.

### Controlling Dust from Abrasive Technologies

- Protect worker health and safety by using respirators as needed.

# COMMUNITY INFORMATION SHEET

## Paint and Coating Stripping Operations

**As a community, what can you do to help reduce air pollution from paint and coating stripping operations?**

### Make Connections

- Get to know local paint and coating stripping operation owners and operators. They know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- One idea is to form a work group that includes both community leaders and paint and coating stripping operation owners and operators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

*See Owner/Operator Information Sheet for more reduction measures.*

### Sponsor Training and Translation

- New skills or new technology that reduces hazardous material usage and generation and results in reduced exposure for workers.
- Small operations may need funding in order to attend or provide training.

### Reward Shops

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Present pollution prevention certificates to shops that reduce pollution.

### Be an Informed Consumer

- Patronize operations that implement pollution prevention strategies.
- Find out how items will be stripped before refinishing.

## For Further Information

- National Paint and Coatings Association: [www.paint.org](http://www.paint.org), (202) 462-6272
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive](http://www.epa.gov/epahome/whereyoulive)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- EPA Sector Strategies Program for the Paint and Coating Sector: [www.epa.gov/sectors/paintcoatings/index.html](http://www.epa.gov/sectors/paintcoatings/index.html)
- EPA's *Guide to Cleaner Technologies: Organic Coating Removal*: [www.p2pays.org/ref/02/01048.pdf](http://www.p2pays.org/ref/02/01048.pdf)
- Paints and Coatings Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- Training opportunities: Paint and coating stripping technology vendors
- Source Reduction Research Partnership's *Source Reduction and Recycling of Halogenated Solvents in Paint Stripping*: [www.p2pays.org/ref/01/00666.pdf](http://www.p2pays.org/ref/01/00666.pdf)
- Toxicity of paints and solvents: Paint suppliers, Integrated Risk Information System (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- For more information, please see the Resources section of the Owner/Operator Information Sheet.





### Could your family be affected?

One company in Minnesota reviewed its paint and coating operations to determine why extra paint stripping was needed. By improving their painting and coating processes, burn-off of racks and reject parts decreased by 20 percent and saved over \$17,000 annually.

— Minnesota Technical Assistance Program

The Paint and Coating Manufacturing Sector partners with EPA to assess opportunities for improving environmental performance while reducing regulatory burden.

— U.S. EPA



# Reducing Air Pollution from: Paint and Coating Stripping Operations

### Why should my paint stripping operation prevent air pollution?

People who are exposed to air toxics at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source. For example, using abrasive blasting with proper particle pollution (dust) controls instead of chemical strippers reduces worker exposure but creates more waste.

Pollution prevention practices may also save money on waste disposal, solvent usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. These practices can go beyond compliance and further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from my paint and coating stripping operation?

- Solvents in chemical paint strippers can release volatile organic compounds (VOC) and some toxic air pollutants. Chemicals in these substances can also react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

- Methylene chloride is found in many chemical paint strippers. While federal, state, local, and Tribal regulations limit the amount of emissions from paint and coating stripping operations, dangerous releases of methylene chloride can occur if a paint and coating stripping operation is not in compliance with regulations.
- Lead, chromium and cadmium are metals that may be generated as particle pollution (dust) during abrasive paint removal or mechanical paint stripping. Breathing dust can cause respiratory problems and other harmful health effects.

### How can I reduce air pollution from my paint and coating stripping operation?

#### Evaluate Painting and Coating Processes

- Assess your painting and coating processes to determine what is causing the need to strip and repaint. Improperly cleaned or dried parts, faulty equipment, or improper handling may damage a product and make it necessary to strip and repaint.

#### Use Chemical Strippers without Methylene Chloride

- Use strippers, such as dibasic ether, that do not contain chemicals that produce toxic air pollutants.
- Use aqueous "hot" strippers.
- Use other solvent "cold" strippers.
- While hot and cold stripping are less toxic than using methylene chloride, use caution when implementing them.

*A facility that repaints 30- and 55-gallon drums for reuse switched from using a hot caustic paint remover to using a mechanical paint removal system of metal and nylon brushes. The net savings was \$35,000 a year, including \$6,000 a year from not needing to purchase sodium hydroxide.*



# OWNER/OPERATOR INFORMATION SHEET

## Paint and Coating Stripping Operations

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### Consider Mechanical Methods

- Rub small areas of non-detailed surfaces with a brush made of wire, animal hair, plastic, or synthetic materials that have been impregnated with abrasive grit.
- Protect worker health and safety by using respirators as needed.

### Implement Abrasive Stripping Techniques

- Tumbling is a stripping method in which parts are placed in a mixer and tumbled with stones or other abrasive material.
- Plastic medium blasting is a paint and coating stripping method that uses nontoxic plastic media to remove paint and coatings from parts. Plastic blasting media can also be recycled and reused until the particles are too small to be effective.
- Wheat starch can be used for blasting. Wheat starch blasting media are made from renewable agricultural products, which reduces nonrenewable resource consumption.
- Sodium bicarbonate can be used for paint and coating stripping by mixing it with water and shooting the mixture at the part to be stripped. The water controls dust and cools the part being stripped.
- Investigate other abrasive paint stripping methods, including carbon dioxide pellet cryogenic blasting, high-pressure water blasting, and medium-pressure water blasting.
- Protect worker health and safety by using respirators as needed.

### Use Heat or Cold to Remove Paint

- Burn-off ovens use high temperatures to burn paint off a surface. Organic paint volatilizes into carbon dioxide and water. Inorganic pigments may need to be scraped off.
- Immerse parts in a molten salt bath. This method also volatilizes organics in coatings into carbon dioxide and water. Inorganic pigments remain on the part and need to be scraped off.
- Use fluidized sand beds. Heated sand or other granulated material vaporizes the organics in the coating and gently removes inorganic residue from the part.
- Flash lamps and lasers are new technologies. Focused light from these two sources is used to heat the coating and decompose it.
- Cryogenic paint stripping freezes the coating until it cracks and can be mechanically removed from the surface.

### Control Dust when Using Abrasive Technologies

- Plastic blasting and wheat starch blasting can generate paint chips that may contain metals such as cadmium and lead.
- Plastic media blasting can create dust that is flammable. Ensure that the dust from plastic media blasting does not reach levels where combustion can occur.
- Protect your workers by using respirators as needed.

### How do I choose which paint and coating stripping technology to use?

Choosing the appropriate paint and coating removal technology to use requires a consideration of many factors such as the location, size, and composition of the object to be stripped.

The size and location of the object may restrict the type of technology that can be used. For example, racks used in painting and coating operations may be too large to move into a chamber for thermal stripping.

The composition of the object to be stripped may limit the kinds of the stripping technology that can be used as well. For instance, some metals may be susceptible to cracking when plastic medium blasting is used. Wheat starch blasting may be preferable.

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Also, sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement cost-saving work practices.





## Could your family be affected?

An agricultural implement manufacturer in Wisconsin switched from stripping rejected parts in a hot sodium hydroxide bath to using plastic media blasting.

### Comparison:

#### *A. Hot Bath Method*

Annual amount of hazardous waste generated: 19,000 pounds

Annual cost of hazardous waste disposal: \$36,000

#### *B. Plastic Media*

#### *Blasting Method*

Cost of plastic media: \$8,000

Capital cost for plastic media blasting unit: \$8,000

Annual cost of hazardous waste disposal plastic media:

**Net annual savings: \$32,000**

— Solvent Alternatives Guide



## OWNER/OPERATOR INFORMATION SHEET Paint and Coating Stripping Operations

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## Resources

- National Paint and Coatings Association: [www.paint.org](http://www.paint.org), (202) 462-6272
- Paints and Coatings Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
- EPA Sector Strategies Program for the Paint and Coating Sector: [www.epa.gov/sectors/paintcoatings/index.html](http://www.epa.gov/sectors/paintcoatings/index.html)
- Small Businesses: [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)

### **Pollution Prevention Techniques**

- U.S. EPA Guide to Cleaner Technologies: [www.p2pays.org/ref/02/01048.pdf](http://www.p2pays.org/ref/02/01048.pdf)
- Reducing waste and hazardous materials: [www.mntap.umn.edu/paint/56-PaintStrip.htm](http://www.mntap.umn.edu/paint/56-PaintStrip.htm)
- Pacific Northwest Pollution Prevention Research Center: [www.pprc.org/pprc/rpd/fedfund/epa/epastd/evalbead.html](http://www.pprc.org/pprc/rpd/fedfund/epa/epastd/evalbead.html)

### **Stripping Alternatives**

- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- Safer stripping and cleaning materials: [www.mntap.umn.edu/paint/55-SaferStripping.htm](http://www.mntap.umn.edu/paint/55-SaferStripping.htm)

### **Toxicity of Chemical Paint Strippers**

- Paint stripper suppliers and vendors
- Integrated Risk Information System (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html)

*An aviation company installed a closed, plastic bead-blast paint stripper system to replace chemical stripping using methylene chloride. Installation costs were \$18,000, and the payback period based on reduced waste-disposal costs alone was estimated at 3.6 years. Overall, the technology is relatively inexpensive and can easily be transferred to other industries and small companies.*

— Pacific Northwest Pollution Prevention Research Center

## Paint and Coating Stripping



### Could your family be affected?

Just 20 old non-EPA-certified wood stoves can emit more than 1 ton of fine particles into your community during the cold months of the year.

— U.S. EPA

Through a collaborative effort, U.S. EPA Region 5 and the Hearth, Patio, and Barbecue Association implemented the Great Stove and Fireplace Changeout Program.

Working closely with the Great Lakes states resulted in the removal and destruction of over 1,200 old woodstoves. Of these, 20 percent of the residents switched from wood heat to gas while the other 60 percent switched to more efficient and less polluting EPA-certified woodstoves or pellet stoves.

— U.S. EPA



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Residential Wood Burning

### Why do residents who burn wood need to reduce air pollution?

People who are exposed to air toxics at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

During the winter months, some people rely on woodstoves, fireplaces, or fireplace inserts as the primary heating device to heat a house or a room. Others enjoy the warmth and ambience of wood heat and only burn wood occasionally.

Wood is a renewable resource with some benefits over non-renewable fossil fuels. However, the smoke created from wood burning can contribute significantly to air pollution and public health problems.

State, local, and Tribal agencies may already have in place pollution prevention programs related to residential wood burning. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from residential wood burning?

- Smoke resulting from improperly burned wood contains many chemical substances that are considered harmful. These include: some toxic air pollutants, fine particle pollution, carbon monoxide, nitrogen oxides, and volatile organic compounds (VOC).
- Toxic air pollutants are an important component of wood smoke. A group of toxic air pollutants known as polycyclic organic matter includes benzo(a)pyrene, which may cause cancer.
- Particle pollution in smoke can damage lung tissue and lead to serious respiratory problems when breathed in high concentrations. In low concentrations, particle pollution in wood smoke can harm the health of children, the elderly, and those with

existing respiratory diseases.

### How can residents reduce wood smoke air pollution?

Making changes in wood burning practices can stop pollutants at the source and increase heating efficiency. By improving these practices, people burning wood can decrease emissions, reduce heating costs, and protect family and public health.

Examples of changes in wood burning practices include:

#### Considering Cleaner Fireplace Fuels

- Natural gas or propane stoves emit very little pollution.
- Pellet stoves burn renewable dried wood and sawdust and burn cleaner than cord wood.

#### Heating More Efficiently

- Replace an old woodstove, fireplace, or fireplace insert with new, more efficient, EPA-certified equipment. New woodstoves use less wood.
- Wood pellets in an appropriate pellet stove produce 25% to 50% less pollution.
- Reduce heating needs by weatherizing.

#### Changing Burning Practices

- Burn only hardwoods that are clean, dry, and seasoned because they produce lower emissions of pollutants.
- Never burn garbage, trash, plastics, paints, solvents, charcoal/coal, or treated woods.
- Burn small, hot fires instead of large, smoldering fires.
- Do not burn when the outdoor air quality is poor.

#### Installing, Inspecting, and Maintaining

- Have your new heating appliances, such as an EPA-certified woodstove, professionally installed to ensure proper operation.
- Have the chimney and the woodstove, insert, or fireplace inspected annually by a professional.
- Clean chimneys on a regular basis.

# COMMUNITY INFORMATION SHEET

## Residential Wood Burning

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### How have government agencies already helped to reduce wood smoke air pollution?

Some government agencies have already taken measures to reduce air pollution from wood burning appliances by:

- Restricting wood burning when local air quality is poor.
- Banning or restricting the installation of wood-burning appliances in new construction.
- Issuing air pollution emission standards and establishing certification requirements for wood heaters.
- Sponsoring woodstove changeout programs.
- Conducting information and outreach efforts.

### Participate in the Great American Woodstove Changeout!

- This campaign, sponsored by US EPA, the Hearth Industry and others, uses educational information and financial incentives to encourage residents to destroy or trade in their old, uncertified, and inefficient woodstoves.
- Manufacturers, distributors, and retailers may offer cash rebates off the purchase price of a new cleaner burning hearth product. See [www.epa.gov/woodstoves](http://www.epa.gov/woodstoves).

### What else can you do to reduce air pollution from residential wood burning?

#### Make Connections

- Get to know local wood burning equipment retailers. They know best about the types of equipment available for residential wood burning and the regulations with which the equipment must comply.
- Get to know members of your community who burn

wood. They can share their concerns about residential wood burning as well as ideas about how to reduce air pollution from wood burning.

- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.
- Communicate the potential health, safety and financial benefits of burning cleaner.

#### Make a Plan

- One idea is to form a work group that includes local citizens and wood burning equipment retailers to develop and implement workable pollution reduction plans. Understand and communicate the health effects from exposure to wood smoke.

#### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

#### Inform Your Community

- Hold public workshops to inform people on how to burn wood more efficiently. See Canada's Burn It Smart program for an effective model.
- Use public workshops to educate residents about new woodstove and fireplace designs that are more efficient and less polluting than old models.

#### Reward Communities

- Use media connections to encourage involvement and provide coverage for successful efforts.
- Visibly display awards or certificates within the community to increase interest.

## For Further Information

- US EPA's Clean Burning Woodstove and Fireplace Web Site: [www.epa.gov/woodstoves](http://www.epa.gov/woodstoves)
- Great American Woodstove Changeout Campaign: <http://www.epa.gov/woodstoves/changeout.html>
- Hearth, Patio and Barbecue Association: [www.hpba.org](http://www.hpba.org), (703) 522-0086
- Woodburning Handbook: [www.arb.ca.gov/cap/handbooks/wood\\_burning/wood\\_burning\\_handbook.pdf](http://www.arb.ca.gov/cap/handbooks/wood_burning/wood_burning_handbook.pdf)
- Chimney Safety Institute of America: [www.csia.org](http://www.csia.org), (623) 547-0920
- Canada's Burn It Smart Program: [www.burnitsmart.org/english/index.html](http://www.burnitsmart.org/english/index.html)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- American Lung Association: [www.lungusa.org/site/pp.asp?c=dvLUK900E&b=23354](http://www.lungusa.org/site/pp.asp?c=dvLUK900E&b=23354), 800-LUNG-USA
- Great Stove and Fireplace Changeout Program: [www.woodstovechangeout.org](http://www.woodstovechangeout.org), (877) 81-STOVE [(877)-817-8683]





## Reducing Air Pollution from: Residential Wood Burning

### Could your family be affected?

The inhalable particle pollution from one woodstove is equivalent to the particle pollution emitted from 3,000 gas furnaces producing the same amount of heat per unit.

— California Air Resources Board

### Why should I reduce air pollution when burning wood in my home?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that can reduce or eliminate air pollution at the source. For example, switching from an old woodstove to an EPA-certified stove reduces the amount of smoke produced when you burn wood.

### Why should I be concerned about air pollution from residential wood burning?

- Smoke resulting from improperly burned wood contains many chemical substances that are considered harmful. These include: some toxic air pollutants, fine particle pollution, carbon monoxide, nitrogen oxides, and volatile organic compounds (VOC).
- Toxic air pollutants are an important component of wood smoke. A group of toxic air pollutants known as polycyclic organic matter includes benzo(a)pyrene, which may cause cancer. Dangerous releases of toxic

air pollutants can occur if you burn wood in a fireplace, old woodstove, or old fireplace insert.

- Particle pollution in smoke can damage lung tissue and lead to serious respiratory problems when breathed in high concentrations. In low concentrations, particle pollution in wood smoke can harm the health of children, the elderly, and those with existing respiratory diseases.

### How can I reduce air pollution from my woodstove, fireplace, or fireplace insert?

- Replace your old dirty woodstove with a cleaner and more efficient heating alternative such as gas, oil, propane, or electric heat. This will reduce your family's and neighbors' exposure to wood smoke pollution and will heat your home more efficiently.
- Burn only clean, dry, and seasoned wood that has been split and dried for at least 6 months.
- Burn hardwood rather than softwoods. Hardwoods are denser and burn more slowly and evenly, which produces less smoke. Hardwoods also provide more heat energy.

*In most areas of the country, wood burning from fireplaces and woodstoves is the largest source of particle pollution generated by residential sources. It can contribute as much as 80% in the winter months.*

— Olympic Region Clean Air Agency



## CONSUMER INFORMATION SHEET

### Residential Wood Burning

#### Heat More Efficiently

- Replace an old woodstove, fireplace insert, or fireplace with an EPA-certified woodstove or EPA-certified fireplace insert. Certified stoves use about one-third as much wood and circulate more heat into the home instead of out the flue. They emit 70% less pollution on average. That means less pollution indoors and out.
- Install a wood pellet stove, which uses compressed wood waste. It uses excess combustion air to make a fire burn hot and clean. These stoves are considered the most efficient stoves available with efficiency ratings exceeding 80%.
- Stop using your fireplace or install an EPA-certified wood burning fireplace insert, which burns fuel more efficiently than a fireplace. Fireplaces typically lose more heat from your home than they provide.

#### Change Operating Practices

- Never burn garbage, trash, plastics, rubber, petroleum products, paints, solvents, charcoal/coal, or treated woods. Burning these materials can be toxic and extremely harmful to your family and neighbors. These toxins can also foul the catalytic combustor and flue.
- Burn small, hot fires instead of large smoldering fires.
- Use small pieces of wood and do not overload the appliance.
- Clean ashes from the stove. Excess ashes can clog a stove's air intake vent, reducing its efficiency.
- Watch the chimney for smoke. Properly burning fires should give off only a wisp of white steam. The darker and thicker the smoke, the more pollutants the fire emits, and the more fuel it wastes.
- Do not burn wood when the outdoor air quality is poor.

#### Inspect and Maintain

- Have a professional inspect and maintain your wood heater and chimney on an annual basis. These inspections are essential to ensure safe and clean wood burning.
- Have a professional clean your chimney regularly to remove creosote buildup. Clean chimneys reduce the chance of a chimney fire.

#### How can I get the most out of my investment in wood burning equipment?

- Select a stove that is certified clean-burning and tested to EPA standards, i.e., those sold after 1992.
- Make sure it's properly installed, and inspected, and maintained.
- Avoid smoldering fires. For example, do not lower the airflow to the stove at night.
- Use only seasoned firewood, split to the right size for your stove or fireplace.
- Reduce your need for fuel: make your home more energy-efficient by weatherizing it.

#### What else can I do to reduce air pollution from wood smoke?

Help your community start a public awareness program to encourage cleaner wood burning practices, including information on the proper operation and maintenance of wood heaters; proper wood selection and use; the health effects of wood smoke; weatherization methods for homes; and determining the proper size of the heating equipment needed before purchase and professional installation. See the "Resources" section on the next page for more sources of information.

*Burning garbage and other materials can be toxic and extremely harmful to the wood burning resident and neighbors. These toxins can also foul the catalytic combustor and flue.*

*Significant levels of smoke pollutants leaking from fireplaces and stoves have been measured in some wood burning homes. If you can smell smoke, there is a problem. This is an important issue, particularly if a family member suffers from respiratory problems or heart disease.*





### Could your family be affected?

EPA-certified stove emits 70% less pollution on average, than non-certified stoves. They can use 1/3 less wood as non-certified stoves and deposit less creosote in chimneys.

That means there is less chance of a chimney fire, and will save you energy, time, and money.

—US EPA



## CONSUMER INFORMATION SHEET Residential Wood Burning

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### Resources

- US EPA's Clean Burning Woodstove and Fireplace Website: [www.epa.gov/woodstoves](http://www.epa.gov/woodstoves)
- Hearth, Patio and Barbecue Association: [www.hpba.org](http://www.hpba.org), (703) 522-0086
- Local Woodstove and fireplace retailers—see yellow pages or [www.hpba.org](http://www.hpba.org)
- Woodburning Handbook: [www.arb.ca.gov/cap/handbooks/wood\\_burning/wood\\_burning\\_handbook.pdf](http://www.arb.ca.gov/cap/handbooks/wood_burning/wood_burning_handbook.pdf)
- Chimney Safety Institute of America: [www.csia.org](http://www.csia.org), (623) 547-0920
- Institute for Tribal Environmental Professionals: [www4.nau.edu/itep](http://www4.nau.edu/itep), (928) 523-9555
- Olympic Region Clean Air Agency (ORCAA): [www.orcaa.org/woodstove.html](http://www.orcaa.org/woodstove.html)
- Burn It Smart Campaign: [www.burnitsmart.org/english/index.html](http://www.burnitsmart.org/english/index.html)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- A Guide to Residential Wood Heating: [www.fiprecan.ca/woodguide.pdf](http://www.fiprecan.ca/woodguide.pdf)
- An Introduction to Home Heating with Wood: [www.canren.gc.ca/app/filerepository/07C50F2F71C04818B9D567D0A2706246.pdf](http://www.canren.gc.ca/app/filerepository/07C50F2F71C04818B9D567D0A2706246.pdf)
- Air Pollution from Wood-Burning Appliances and Fireplaces: [www.eere.energy.gov/consumerinfo/factsheets/ja3.html](http://www.eere.energy.gov/consumerinfo/factsheets/ja3.html)
- Woodstoves and Fireplaces: [www.ysaqmd.org/woodstv.htm](http://www.ysaqmd.org/woodstv.htm)
- About the Air: 2001 Clean Air Excellence Award Recipients: [www.deq.state.mi.us/documents/deq-aqd-newlt-April02.pdf](http://www.deq.state.mi.us/documents/deq-aqd-newlt-April02.pdf)

*Placer County Air Pollution Control District in California has implemented a rebate program to encourage residents to replace high polluting non-EPA certified stoves with newer, cleaner-burning stoves such as an EPA Phase II certified woodstove, or a pellet stove or gas stove.*

— Placer County Air Pollution Control District

*Just 20 old non-EPA-certified wood stoves can emit more than 1 ton of fine particles into your community during the cold months of the year.*

— U.S. EPA



## Residential Wood Burning



### Could your family be affected?

Ohio EPA's Office of Pollution Prevention has published "Woodworking and Refinishing Pollution Prevention Opportunities," which provides examples of how to calculate cost savings and environmental benefits. Any company can insert their material usage numbers and calculate potential cost savings and environmental benefits.

— Office of Pollution Prevention,  
Ohio Environmental Protection Agency

EPA has developed an online pollution prevention tool for paints and coatings. Called The Coatings Guide™, this guide contains several tools to help users identify coatings with low VOC and hazardous air pollutant content that may be suitable for replacing more toxic paints or coatings.

— U.S. EPA



## COMMUNITY INFORMATION SHEET

# Reducing Air Pollution from: Wood Furniture Operations

### Why do wood furniture operations need to reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention can reduce the impact of air pollution by using materials, processes, or practices that reduce or eliminate air pollution at the source.

Wood furniture operations manufacture or finish furniture for homes, offices, stores, public buildings, and restaurants. Wood furniture operations activities include drying, sawing, waxing, sanding, and finishing, all of which may release pollutants into the air and may contribute to health concerns in the operation and in the community.

The best wood furniture operations implement pollution prevention strategies not only to help comply with federal, state, local, and Tribal laws but also to further minimize impacts on human health and the environment. Check with your state, local, and Tribal agencies for existing regulations.

### What kinds of air pollutants may come from wood furniture operations?

- Wood furniture operations can produce emissions of toxic air pollutants.
- Finishes, stains, and topcoats applied during the finishing process can release some toxic air pollutants and volatile organic compounds (VOC). Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.
- Other sources of toxic emissions include adhesives used for gluing and solvents used during cleanup.

Stripping processes during refinishing can also emit air pollution.

- While federal, state, local, and Tribal regulations limit the amount of emissions from wood furniture operations, dangerous releases of toxic air pollutants can occur if a wood furniture operation is not in compliance with regulations.

### How can wood furniture operations reduce air pollution?

Making changes in operation work practices can stop pollutants at the source and increase production efficiency. By evaluating and improving work practices, operations can decrease emissions, reduce production costs, and protect employee and public health.

Examples of changes in work practices that help reduce air pollution include:

#### Substituting Materials

- Use alternative coating and adhesive formulations with lower toxic air pollutant and VOC content.
- Use cleaners with lower toxic air pollutant and VOC content.

#### Increasing Application Efficiency

- Replace old equipment with new and efficient equipment, such as high-volume low-pressure (HVLP) spray, airless spray, air-assisted airless spray, or electrostatic spray guns.
- Train painters in proper spray application techniques to reduce emissions and enhance the quality of the paint finish.
- Use a coating method that does not require spraying.

#### Changing Cleaning Procedures

- Use cleaning procedures that reduce the amount of solvent needed.
- Schedule production runs to minimize the amount of cleaning needed between colors or products.

# COMMUNITY INFORMATION SHEET

## Wood Furniture Operations

### Recycling Materials

- Reuse cleaning solution or solvent by using dirty solvent for initial cleaning, following with clean solvent.
- Use an on-site distillation unit to recycle dirty cleaning liquid.
- Recover solvents for reuse.

**As a community, what can you do to help reduce air pollution from wood furniture operations?**

### Make Connections

- Get to know local wood furniture operation owners and operators. They know best about the materials and processes used in their business and the regulations with which they must comply.
- Keep local media aware of progress by sending them updates. Publicity can reward success and attract more public involvement.

### Make a Plan

- Form a work group that includes area owners and operators to develop and implement workable pollution reduction plans.

### Locate Resources

- Use the "For Further Information" list below to find governmental and nonprofit contacts who can provide help with analysis, technical information, equipment, and funding.

### Sponsor Training and Translation

- Small operations may need funding in order to attend or provide training.
- Improved skills lead to reduced finishing material usage and exposure for workers.

### Reward Operations

- Use media connections to provide coverage for successful efforts. Positive publicity can mean increased business.
- Visibly displayed awards or certificates may also increase business.

## For Further Information

- American Home Furnishings Alliance: [www.afma4u.org](http://www.afma4u.org), (336) 884-5000
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- National Emission Standards for Hazardous Air Pollutants: Wood Furniture Manufacturing Operations: [www.epa.gov/ttn/atw/wood/riwood.html](http://www.epa.gov/ttn/atw/wood/riwood.html)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- Community information, regional, state contacts: [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm)
- Pollution prevention awards: State, local, and Tribal government agencies, universities
- Painting technique training opportunities: The American Home Furnishings Alliance, Iowa Waste Reduction Center: [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm), (800) 422-3109
- Toxicity of paints and solvents: Local wood manufacturing trade associations, Integrated Risk Information Systems (IRIS) ([www.epa.gov/iris](http://www.epa.gov/iris)), Air Toxics Health Effects Notebooks ([www.epa.gov/ttn/atw/hapindex.html](http://www.epa.gov/ttn/atw/hapindex.html))
- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- The Coatings Guide™: [www.cage.rti.org](http://www.cage.rti.org)
- For more information, please see the Resources section of the Owner/Operator Information Sheet.

*Switching coating types reduces emissions of VOC and toxic air pollutants by 25%.*

— Pacific Northwest Pollution Prevention Resource Center





### Could your family be affected?

One furniture manufacturer installed a 7-gallon solvent recovery unit for \$4,500. By running it 2 times a day, it recovered 5 gallons of reusable solvent for every 7 gallons of cleanup waste. Waste reduction was 1,900 pounds per year, and cost savings were \$3,200 a year.

— University of Wisconsin  
Solid and Hazardous  
Waste Education  
Center

### Why should my wood furniture operation reduce air pollution?

People who are exposed to toxic air pollutants at sufficient concentrations, for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, customers, and families by using materials, processes, or practices that can reduce or eliminate air pollution at the source. For example, covering containers of cleaning solvents prevents vapors from affecting your employees.

Pollution prevention practices also save money on waste disposal, materials usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, or Tribal agencies and may already voluntarily implement pollution prevention practices. However, increasing pollution prevention efforts can further minimize impacts on human health and the environment.

### Why should I be concerned about air pollution from my wood furniture operation?

- Wood furniture operations can produce emissions of toxic air pollutants.
- Finishes, stains, and topcoats applied during the finishing process can release some toxic air pollutants and

volatile organic compounds (VOC).

Chemicals in these substances can react in the air to form ground-level ozone (smog), which has been linked to a number of respiratory effects.

- Other sources of toxic emissions include adhesives used for gluing and solvents used during cleanup. Stripping processes during refinishing can also emit air pollution.
- While federal, state, local, and Tribal regulations limit the amount of emissions from wood furniture operations, dangerous releases of toxic air pollutants can occur if a wood furniture operation is not in compliance with regulations.

### How can I reduce air pollution from my wood furniture operation?

#### Substitute Materials

- Use alternative adhesive systems or formulations such as hot melts, hot seal, aqueous-based, or polyvinyl acetate.
- Switch to less toxic coating types such as high-solids nitrocellulose, aqueous-based, ultraviolet (UV) cured, or polyester/polyurethane.
- Use aqueous-based cleaners which have lower toxic air pollutant and VOC content.
- Use alternative stripping materials that contain N-methyl pyrrolidone or gamma-butyrolactone. These are water-soluble, biodegradable solvents.

*Using fully enclosed spray gun washers reduces solvent evaporation by approximately 50%.*

— Office of Pollution Prevention, Ohio  
Environmental Protection Agency



# OWNER/OPERATOR INFORMATION SHEET

## Wood Furniture Operations

9/12/2005

- Instead of solvents, use heat to adjust viscosity of the coating. This reduces the amount of solvent used.

### Increase Application Efficiency

- Use more efficient paint application equipment to reduce overspray such as switching to a high-volume, low-pressure spray (HVLP), airless spray, air-assisted airless spray, or electrostatic spray guns.
- Train painters in proper spray application techniques. Proper training, which includes information on gun position, motion, triggering, and overlap, can reduce air pollutant emissions and enhance the quality of the paint finish.
- Use a coating method that does not require spraying such as vacuum coating, dip coating, roll coating, flow coating, dry coating, and curtain coating.

### Lower Emissions at the Source

- Cover all containers securely to reduce the chance of spills when transferring materials.
- Use funnels or pumps to avoid spills when dispensing materials.
- Keep glue containers covered to reduce toxic vapors.
- Minimize evaporative emissions by using enclosed or mechanical parts washing and gun washing systems.
- Store rags and towels in a closed container.

### Change Cleaning Procedures

- Use mechanical cleaning such as scraping or wiping before using solvents.
- Minimize solvent use by cleaning spray guns in a gun washer.
- Use water-based detergents or acetone in place of more toxic cleaning solutions.
- To reduce the frequency of cleaning equipment, arrange light-color to dark-color batch sequencing
- Schedule production runs to minimize the number of color changes.

### Recycle Materials

- Reuse cleaning solution or solvent. Use dirty solvent for initial cleaning, then follow with clean solvent.
- Use an on-site distillation unit to clean dirty cleaning liquid. This makes the solvent available for reuse in the production process. On-site distillation reduces both the cost of solvent disposal and fresh solvent purchase.

- Recover solvents for reuse.
- Collect and reuse any staining operations overspray.

### Upgrade Your Operation's Equipment

- Check with your state, local, or Tribal pollution prevention office for funding possibilities.

### Are HVLP spray guns really better? Where can I find out about training?

HVLP guns are better if technicians are trained properly. Toxic air pollutant emissions released during a painting operation are directly related to the skill of the spray gun operator.

Properly used, HVLP spray guns often result in a higher transfer efficiency, which results in reduced overspray.

Reduced overspray reduces costs and worker exposure to toxic emissions.

Information about training may be found at

- Iowa Waste Reduction Center: [www.iwrc.org/programs/STAR.cfm](http://www.iwrc.org/programs/STAR.cfm) or call (800) 422-3109
- Local or state pollution prevention offices
- Spray equipment suppliers

### What else can I do to reduce air pollution?

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups.

Many pollution prevention offices offer free on-site assessments for interested businesses. A list of these small business assistance programs can be found at [www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness). This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Sponsor employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who implement a work practice that reduces both costs and pollution.



### Could your family be affected?

One furniture manufacturer replaced all air spray guns with HVLP guns and reduced the amount of coating needed to spray production parts by 39%.

HVLP gun cost: \$8,125.

Payback period: 3 weeks.

Reason: Decreased coating purchases.

— Pollution



## Resources

- American Home Furnishings Alliance: [www.afma4u.org](http://www.afma4u.org), (336) 884-5000
- EPA Air Toxics Web Site: [www.epa.gov/ttn/atw/](http://www.epa.gov/ttn/atw/)
- Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)
- National Emission Standards for Hazardous Air Pollutants: Wood Furniture Manufacturing Operations: [www.epa.gov/ttn/atw/wood/riwood.html](http://www.epa.gov/ttn/atw/wood/riwood.html)
- Wood Furniture and Fixtures Industry Sector Notebook: [www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/wdfurnsn.pdf](http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/wdfurnsn.pdf)
- Paint and Coatings Resource Center: [www.paintcenter.org](http://www.paintcenter.org)
- University of Wisconsin Solid and Hazardous Waste Education Center: [www.uwex.edu/ces/ag/sus/wood/pdfindex/](http://www.uwex.edu/ces/ag/sus/wood/pdfindex/)
- Pollution Prevention: [www.pprc.org/pubs/factsheets/laund7.html](http://www.pprc.org/pubs/factsheets/laund7.html)

### Alternatives

- Solvent Alternatives Guide: [www.sage.rti.org](http://www.sage.rti.org)
- The Coatings Guide™: [www.cage.rti.org](http://www.cage.rti.org)

### Toxicity of Solvents

- Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
- Air Toxics Health Effects Notebooks: [www.epa.gov/ttn/hapindex.html](http://www.epa.gov/ttn/hapindex.html)

*Ohio EPA's Office of Pollution Prevention has published "Woodworking and Refinishing Pollution Prevention Opportunities," which provides examples of how to calculate cost savings and environmental benefits. Any company can insert their material usage numbers and calculate potential cost savings and environmental benefits.*

— Office of Pollution Prevention, Ohio  
Environmental Protection Agency



# Glossary

Some terms within the Information Sheets may be unfamiliar to you and may be terms you encounter when you talk with owners and operators about pollution prevention. The General Terms define words and phrases typically used in the pollution prevention world as whole. The Topic-Specific terms are words or phrases that may be associated with particular business sectors. These sectors are listed in parentheses after the definition.

## General Terms

**Air Emissions** – The release or discharge of a pollutant into the air.<sup>1</sup>

**Carcinogen** – An agent capable of inducing cancer.<sup>2</sup>

**Fine Particulate Matter** – Particulate matter less 2.5 microns across or less.

**Fugitive Emissions** – Emission of a chemical to the air that does not occur from a stack, vent, duct, pipe, or other confined air stream (e.g., leaks from joints).<sup>3</sup>

**Greenhouse Gas (GHG)** – Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrochlorofluorocarbons (HCFCs), ozone (O<sub>3</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).<sup>4</sup>

**Hazardous Air Pollutants (HAPs)** – Defined under the Clean Air Act as pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. Currently, the Clean Air Act regulates 188 chemicals and chemical categories as HAP.<sup>5</sup>

**Heavy metals** – Metals such as chromium, cadmium, mercury, and lead.

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<sup>1</sup> Risk Glossary from Ken Mitchell.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.



**Ozone Depleting Substances (ODSs)** – Substances that cause the deterioration of the earth's protective ozone layer.

**Particle Pollution** – Fine liquid or solids such as dust, smoke, fumes, or smog found in air or emissions.<sup>6</sup>

**Pollution Prevention (P2)** – Pollution prevention is the use of materials, processes, or practices that reduce or stop the creation of pollutants or waste at the source. It includes improved operating practices like material substitution, process and equipment modifications, and energy and wastewater conservation. Pollution prevention is stopping pollution before it starts.

**Solvent** – A solvent is a liquid that is capable of dissolving another substance to make a new solution. Solvents are used to dissolve paint solids to make paint and as cleaning solutions because they dissolve grease and oils.

**Source** – Any place or object from which pollutants are released.<sup>7</sup>

**Substrate** – The material on which another material is coated or fabricated (substratum).<sup>8</sup>

**Toxicity** – The degree to which a substance or mixture of substances can harm humans or animals.<sup>9</sup>

**Volatile Organic Compounds (VOC)** – Organic compounds (such as a solvent, thinner, or an alcohol-based material) that evaporates easily into the air and is the leading cause of ground-level ozone (air pollution, also known as smog.) Volatile Organic Compounds include toluene, benzene, and xylene, which are also HAPs.

**Work practices** – an action performed by workers to prevent or reduce emissions of air toxics. Such actions can include vacuuming up dust, opening containers only when necessary, and keeping employees updated on housekeeping measures.<sup>10</sup>

## Topic-Specific Definitions

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<sup>6</sup>EPA Terms of Environment.

<sup>7</sup>Glossary by Ken Mitchell.

<sup>8</sup>American Heritage Dictionary

<sup>9</sup>EPA Terms of Environment.

<sup>10</sup>Drawn from knowledge & context of fact sheets.

**Aneroid blood pressure cuffs** – non-liquid blood pressure cuffs. (Hospitals)

**Bath** – a tank of chemicals in which a metal part is dipped to apply a metal coating. (Electroplating Operations)

**Bath dumps** – Chemicals that have degraded or become contaminated over time and no longer serve their function. (Electroplating Operations)

**Carbon adsorbers** – Control devices that remove vapors from an air stream by adsorbing the vapor onto an activated carbon surface. (Dry Cleaning Operations)

**Creosote** – An oily residue that forms from unburned wood gases. (Residential Wood Burning)

**Densified logs** – Logs that are made of compressed sawdust. (Residential Wood Burning)

**Diisocyanates** – Chemicals in auto body part painting operations, especially for clear coat applications, which are a leading cause of occupational asthma. (Auto Body Shops, Metal Operations)

**Dry, seasoned wood** – Wood that has been split and dried for at least six months and has <20% moisture by weight. (Residential Wood Burning)

**Fountain solution** – A plating solution that keeps the ink from adhering where it should not on the plate. (Printing Operations)

**Gun wash system** – A cleaning system used to clean spray guns after being used to spray auto body parts. (Auto Body Shops, Paint and Coating Operations, Metal Operations, Wood Furniture Operations, Shipbuilding and Repair and Repair Operations)<sup>11</sup>

**High solids paints and coatings** – Paints and coatings with more solids and less solvents than conventional coatings. (Auto Body Shops, Paint and Coatings Manufacturing, Paint and Coating Operations, Wood Furniture Operations)

**High-Volume Low-Pressure (HVLP) spray guns** – A spray gun that uses columns of low pressure air to cause turbulence within the paint as the first stage of atomization. The air used for the final step of atomization originates from high-volume turbine blowers and is transferred to the gun using large-diameter air lines.<sup>12</sup> (Auto Body Shops, Paint and Coating Manufacturing,

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<sup>11</sup>Derived from context in auto body fact sheet.

<sup>12</sup>University of Northern Iowa, Small Business Pollution Prevention Center. Autobody Surface Coating: A Practical Guide to Reducing Air Emissions. P. 10.

Paint and Coating Operations, Metal Operations, Wood Furniture Operations, Ship Building and Repair Operations, Commercial Construction)

**Incomplete Combustion** – Fuel from the firewood that does not burn. (Residential Wood Burning)

**Low emission vapor degreasers (LEVD)** – Completely enclosed, airtight units used to clean off machining oil and other contaminants from metal parts. (Metal Operations)

**Metalizing** – A process in which pure metal (not paint) is sprayed onto a ship's surface. (Shipbuilding and Repair Operations)

**Off-Specification** – Paint or coating material that does not meet quality or customer specifications. (Paint and Coating Manufacturing)

**Overspray** – The amount of spray that misses its target (Auto Body Shops, Paint and Coating Operations, Metal Operations, Wood Furniture Operations)

**Pigment** – Provides color to the paint or coating. (Paint and Coating Manufacturing)

**Plating** – The process where the surface of the metal is modified by adding several layers of metal coating by using a series of baths and then allowing the part to dry. (Electroplating Operations)

**Pyrometallurgical treatment** – High temperature processing used in metal casting. (Metal Operations)

**Refrigerated condensers** – Control devices that recover solvent vapor emissions by cooling the air stream to the point it condenses to liquid form. (Dry Cleaning Operations)

**Sharps** – Items such as needles or broken glass that may puncture the skin. (Hospitals)

**Solvent-based inks** – Set by evaporation of the ink oil at elevated temperatures. (Printing Operations)

**Spill container** – Catches and contains spilled solvent from the dry cleaning machine. (Dry Cleaning Operations)

**Transfer efficiency** – The percentage of material atomized through the spray gun that actually ends up as a coating on the desired surface. (Auto Body Shops, Paint Operations, Metal

Operations, Wood Furniture Operations, Shipbuilding and Repair Operations)<sup>13</sup>

**UV-Cured Inks** – Inks that are set by using radiant energy. (Printing Operations)

**UV Light Cured Coatings** – These coatings use UV light to set the coating instead of solvents. (Paint and Coating Operations, Wood Furniture Operations, Metal Operations)

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<sup>13</sup>University of Northern Iowa. Small Business Pollution Prevention Center. Autobody Surface Coating: A Practical Guide to Reducing Air Emissions. P. 7.



## Additional Information

To further assist you as you work with small business owners and operators, we have supplied additional information. These include resources for small businesses, information about state local pollution prevention offices, pollution prevention programs within the U.S. Environmental Protection Agency, and independent pollution prevention offices.

### Small Business Assistance Program

As a result of the Clean Air Act Amendments of 1990 (the Act), all States must develop a program to assist small businesses in meeting the requirements of the Act. Since then, these programs have expanded to provide assistance in other environmental areas, including water and waste issues. See Table 1 in the Contacts section for a listing of small business programs by state. You can also find a listing at [www.smallbiz-enviroweb.org/sba/sbap.html](http://www.smallbiz-enviroweb.org/sba/sbap.html).

Likewise, EPA has established its own Small Business Assistance Program (SBAP) to provide technical assistance to these State small business programs. Information about the SBAP can be found at [www.epa.gov/ttn/sbap](http://www.epa.gov/ttn/sbap). This site contains information small businesses need to know related to general compliance issues from the Act (i.e., environmental audit protocols, small business compliance policies, EPA audit policy) as well as information pertaining to specific types of businesses. Examples include a compliance guide for the auto body repair industry, architectural coatings guide, and guides on wood finishing and furniture rules and regulations. This information is available directly from the internet or in downloadable form.

### Small Business Gateway

The EPA maintains a small business gateway website ([www.epa.gov/smallbusiness](http://www.epa.gov/smallbusiness)) that has a list of several types of resources. These resources are briefly described below.

- **General Small Business and Environmental Information** – Offers links both within the EPA and other Federal government agencies where information related to how small businesses and can comply with air quality regulations is available.
- **Environmental Assistance and Technical Help** – Contains a listing of websites and downloadable material available through the EPA.
- **Contacts and Environmental Experts** – Lists contacts within the EPA as well as State and local environmental agencies or departments, and local Small Business Administration sources. It also provides links to industrial sector representatives who specialize in compliance and pollution prevention techniques for their industry.

- **Environmental Regulations and Laws** – Serves as a collection point linking to the Federal Register, the Code of Federal Regulations, the United States Code, and other types of environmental regulations and laws that might impact small businesses.
- **The Bottom Line: Saving and Finding Money** – Presents information and links related to Federal assistance, business financing, doing business with the EPA, and financial models.
- **Frequently Answered Questions** – Lists questions and answers that small business owners and operators may have about air quality requirements and business assistance.

## **State and Local Pollution Prevention Offices**

State and local pollution prevention offices also offer further information regarding pollution prevention methods and training for small businesses interested in pollution prevention. Tables 2 and 3 in the Contacts section list state and local pollution prevention programs. This listing may also be found on the internet at [www.epa.gov/epahome/whereyoulive.htm](http://www.epa.gov/epahome/whereyoulive.htm).

## **EPA Programs**

The EPA has implemented several pollution prevention programs aimed at preventing pollution across the board. These include the Design for the Environment, Enviro\$en\$e, pollution prevention, and compliance assistance centers. These programs will be discussed in more detail in the following sections. Links to these programs and other pollution prevention programs may be found at [www.epa.gov/epahome/p2pgram.htm](http://www.epa.gov/epahome/p2pgram.htm).

### ***EPA Pollution Prevention Offices***

Within its ten Regions, the EPA has established pollution prevention offices. Personnel within these offices offer technical assistance and information specifically tailored to their Region. Moreover, they can provide contacts for further pollution prevention information. Table 4 in the Contacts section lists the EPA Regional Pollution Prevention contacts.

### ***EPA's Design for the Environment***

The Design for the Environment (DfE) program is one of EPA's premier partnership programs. The purpose of the DfE is to work with individual industry sectors to compare and improve the performance, and reduce the human health and environmental risks, and costs of existing and alternative products, processes, and practices. These partnership projects promote integrating cleaner, cheaper, and smarter solutions into everyday business practices. The following briefly describe each partnership project. Also, more information is available at [www.epa.gov/oppt/dfe](http://www.epa.gov/oppt/dfe).

- **Automotive Refinishing** – Works with the automotive repair industry and individual shops both to raise awareness of the health and environmental concerns related to refinishing activities and to encourage the use of safer, cleaner, and more efficient practices and technologies. For pollution prevention information related to air toxics from auto body shops, please see the auto body information sheets.
- **Adhesives** – Formed an Adhesives Technologies Partnership that works with members of the adhesives industry, Federal, state, and local governments, and public interest groups to develop alternative solvents and processes for adhesive technologies. Currently, the Partnership is focusing on creating safer substitutes for methylene chloride-based fabricated foam adhesives used in the fabricated foam furniture and sleep products industry.
- **Computer Display** – This partnership is investigating the life-cycle states, processes, and/or materials that contribute to environmental impacts from the products. The information collected will be used to identify opportunities for product improvement and will reduce potentially adverse environmental impacts and costs.
- **Garment and Textile Care** – This partnership is committed to promoting environmentally benign technologies for garment and textile care through a systems approach to the development, manufacture, distribution, and care of garments and textile products. For pollution prevention information related to air toxics from dry cleaners, please see the Dry Cleaning Operations information sheets.
- **Flexographic Printing** – This partnership provides technical information and pollution prevention tips to printers doing flexographic printing to help them perform as efficiently and environmentally responsible as possible. For pollution prevention information related to air toxics from the printing industry, please see the Printing Operations information sheets.
- **Formulator** – DfE created the Formulator Initiative to encourage and assist formulators in designing products with more positive environmental and health profiles than conventional products. Through this initiative, the DfE can supply formulators with information on chemical characteristics and toxicities of raw materials or additives as well as recognize DfE Formulator Initiative partners.
- **Gravure Printing** – This partnership's goals are to (1) Identify common environmental issues for small- and medium-sized printers in the packaging and product sectors; and (2) encourage printers and product sectors to address these issues by reducing risk and preventing pollution. For information related to pollution prevention, please see the Printing Operations information sheets.



- **Industrial and Institutional Laundry** – This partnership was formed to develop products with improved environmental and human health characteristics. This partnership works to remove polluting chemicals from formulations, increase environmental and health benefits through using reformulated products, and advance energy and water efficiency, resource conservation, and innovative technologies.
- **Integrated Environmental Management Systems** – An Environmental Management System is a set of management tools and principles that allows companies to systematically manage environmental health and safety matters. This partnership takes the ISO 14001 framework several steps further by incorporating redesign, chemical risk management, use of cleaner technologies, and pollution prevention.
- **Lead-Free Solder Partnership** – This is a voluntary partnership with members of the electronics industry and other interested parties. They are evaluating the environmental impacts of tin-lead, tin-copper, tin-silver-copper, and tin-silver-copper, bismuth solders by using a life-cycle assessment approach.
- **Lithographic Printing** – This partnership's goals are to incorporate environmental considerations into business decisions and to switch to blanket washes that contain fewer VOC, lower vapor pressure and fewer hazardous chemicals, where appropriate. For pollution prevention information related to the lithographic printing industry, please see the Printing Operations information sheets.
- **Printed Wiring Board (PWB)** – This partnership was formed to foster open and active participation in addressing environmental challenges faced by the PWB industry. Moreover, it has identified, evaluated, and disseminated information on viable pollution prevention opportunities within the industry.
- **Screen Printing** – This partnership is focusing on two projects. First, they are developing an industry-wide IEMS to identify and reduce chemical risk. Second, they are developing a Cleaner Technologies Substitutes Assessment (CTSA) and have completed a comparison of the environmental and human health risks. For more information on pollution prevention in the screen printing sector, please see the Printing Operations information sheets.

## **Enviro\$en\$e**

Enviro\$en\$e is a free, public environmental information system found on the internet. This website provides users with pollution prevention/cleaner production solutions, compliance and enforcement assistance information, and innovative technology and policy options. In particular, it includes information on solvent substitution materials. The following briefly describe the information found in Enviro\$en\$e.

- **Integrated Solvent Substitution Database (ISSDS)** – The ISSDS provides access to information from multiple data systems related to solvent alternatives.
- **Solvent Alternatives Guide (SAGE)** – Evaluates the user's current operating scenario and then identifies possible surface cleaning alternative solvent chemistries and processes that best suits the defined operating and materials requirements.
- **Hazardous Solvent Substitution Data System (HSSDS)** – The HSSDS is a comprehensive system of information on the alternatives to hazardous solvents as well as related substances. It lists product information, material safety data sheets, and other related information.
- **Joint Service Pollution Prevention Technical Library** – The Joint Service Pollution Prevention Technical Library is maintained by the Naval Facilities Engineering Service Center and is available by direct access or by search facilities to foster technology transfer with other organizations.
- **Department of Defense Ozone Depleting Chemical/Substance Information** – Offers information and databases related to ozone-depleting chemicals and substances used by the Department of Defense.
- **Solvent Handbook Database System (SHDS)** – Provides access to environmental and safety information related to solvents used in maintenance facilities and paint strippers.
- **Solvents Database (SOLV-DB)** – Provides an easily accessed gateway to a wide variety of data on solvents.
- **Materials Compatibility Database (MATCOMPAT)** – Gives laboratory test data to assist in the implementation of ODC-free alternative solvents that are compatible with materials used in electronic assemblies.
- **Related Documents** – Other related documents are also linked on this website. See the Enviro\$en\$e website, [www.es.epa.gov](http://www.es.epa.gov) for more information.

## ***Compliance Assistance Centers***

EPA partners with industry representatives and others on sector-specific Compliance Assistance Centers. These centers support various industries providing tools such as checklists, plain language guides, and technical information to help small businesses understand their regulatory requirements. The following is a list of sectors and their websites:

- Agriculture: [www.epa.gov/agriculture/](http://www.epa.gov/agriculture/)
- Auto Recyclers: [www.ecarcenter.org](http://www.ecarcenter.org)
- Chemicals: [www.chemalliance.org](http://www.chemalliance.org)
- Construction: [www.ciccenter.org](http://www.ciccenter.org)
- Federal Facilities: [www.epa.gov/fedsite](http://www.epa.gov/fedsite)
- Local Government: [www.lgean.org/](http://www.lgean.org/)
- Metal Finishing: [www.nmfrc.org/](http://www.nmfrc.org/)
- Paints and Coatings: [www.paintcenter.org/](http://www.paintcenter.org/)
- Printed Wiring Boards: [www.pwbrc.org/](http://www.pwbrc.org/)
- Transportation: [www.transource.org](http://www.transource.org)

**National Agriculture Compliance Assistance Center.** This center serves as a “first stop” for information related to environmental requirements that impact the agriculture community. It offers comprehensive, easy-to-understand information about compliance which are commonsense, flexible approaches that are both environmentally protective and agriculturally sound. It includes information on pollution reduction and prevention technologies.

**Environmental Compliance for Automotive Recyclers (ECAR).** Funded by the EPA, ECAR serves as a central clearinghouse to answer questions regarding preparing for environmental inspections, complying with regulations, and saving money by incorporating necessary changes.

**Coordinating Committee for Automotive Repair (CCAR).** The CCAR is a compliance assistance center that aids those involved in the automotive repair industry to better understand their environmental responsibilities.

**ChemAlliance.** This organization provides regulatory information for the chemical process industries. It also lists over 350 pollution prevention case studies and 200 good management practices that are linked to specific process operations and site locations where they can be applied.

**Construction Industry Compliance Assistance Center.** Funded by the EPA, this site offers a plain language explanation of environmental rules for the construction industry. It also provides links to detailed information, including State regulations and other resources.

**FedSite.** This site serves as a virtual compliance assistance center containing environmental regulations, pollution prevention, and policies affecting Federal agencies. It offers a virtual tour of a Federal facility and provides links to other Federal agencies as well as State environmental programs.

**Local Government Environmental Assistance Network (LGEAN).** LGEAN offers a “first stop shop” for a local government’s elected and appointed officials related to environmental management, planning, funding, and regulatory information.

**National Metal Finishing Resources Center (NMFRC).** This organization provides a clearinghouse for all types of metal finishing compliance and pollution prevention information. It features experts who can answer various questions metal finishers may have about compliance and pollution prevention.

**Paints and Coatings Resource Center (PCRC).** This center’s main goal is to deliver regulatory and pollution prevention information either directly to businesses or indirectly through state and local agencies and consultants. Also, PCRC has pertinent information related to paints and coatings in the home.

**Printed Wiring Board Resource Center (PWBRC).** The PWBRC provides easy-to-use, in-depth technical information on pollution prevention and regulatory compliance for the printed wiring board industry.

**Printers’ National Environmental Assistance Center (PNEAC).** The PNEAC is a partnership between industry, government, and university technical assistance providers serving the printing industry. It assists regulatory agencies and technical assistance providers by delivering current, reliable environmental compliance and pollution prevention information to printers, publishers, and packagers.

**Transportation Environmental Resource Center (TransSource).** This organization identifies up-to-date information on environmental compliance requirements and to make that information available to transportation professionals and the public.

### ***Pollution Prevention***

EPA maintains a pollution prevention website that serves as a clearinghouse for information related to pollution prevention. EPA sees pollution prevention as

a vehicle for ‘reinventing’ traditional Agency programs and devising innovative alternative strategies to protect public health and the environment. It is a key element of new EPA initiatives to focus attention on reducing risks from persistent, bioaccumulative toxic pollutants in the air, in water, and on land; to promote environmental justice and urban environmental quality; to empower state and tribal programs; to lower the incidence of climate change; and to demonstrate the results and benefits of our labors.<sup>1</sup>

In essence, pollution prevention plays a primary role in environmental performance and sustainability within the private sector. The pollution prevention homepage provides the following links:

- EJP2 (Environmental Justice Pollution Prevention) – EPA has provided funding to help minority and low-income communities address environmental concerns through pollution prevention. This website provides information related to these projects.
- EPP (Environmentally Preferable Purchasing) – The EPP program is a program for Federal agencies that encourages them to purchase environmentally preferable products and services. These products or services should have a reduced effect on human health and the environment when compared to competing products and services that serve the same purpose.
- PBT (Persistent Bioaccumulative and Toxic) Program – EPA is working on a new approach to reduce exposure to and risk from PBT chemicals. They are accomplishing this through increase coordination among EPA national and Regional programs by creating an enduring cross-office system that will address cross-media issues associated with priority PBT pollutants. This link provides more information related to EPA’s PBT Chemical Program.
- Green Chemistry – Green chemistry promotes the design of chemical products and processes that reduce or eliminate the generation of hazardous materials. This web page provides links to EPA’s Green Chemistry Program.

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<sup>1</sup>U.S. EPA, [www.epa.gov/opptintr/p2home](http://www.epa.gov/opptintr/p2home).

- Green Meetings – This web page provides information and links to show meeting planners how to effectively plan a meeting and minimize the negative impact that meetings can have on the environment.
- Environmental Labeling – Environmental Labeling, also known as environmentally preferable purchasing (EPP) covers a broad range of activities ranging from business-to-business transfers of product-specific environmental information to environmental labeling in the marketplace. This web page contains links to EPP guidance, Federal efforts, tools, documents, and other links.
- Design for the Environment – See the above section related to Design for the Environment.
- Environmental Accounting – This web page links to the Environmental Management and Accounting (EMA) international website.

## **Other Pollution Prevention Programs**

Several organizations outside EPA have developed websites that serve as a clearinghouse for information related to pollution prevention. Many of these organizations are regionally based, but they contain information that may apply to your area. Below is a listing of these sites. Table 5 in the Contact system lists those organizations with specific contacts.

- Northeast States Pollution Prevention Roundtable/P2 Information Center: [www.newmoa.org](http://www.newmoa.org)
- Waste Reduction Resource Center/P2 Information Center: [www.wrrc.p2pays.org](http://www.wrrc.p2pays.org)
- Great Lakes Regional Pollution Prevention Roundtable/P2 Information Center: [www.glrppr.org](http://www.glrppr.org)
- Southwest Pollution Prevention Information Center/P2 Information Center: [www.p2.utep.edu](http://www.p2.utep.edu)
- Region 7 Pollution Prevention Regional Information Center/P2 Information Center: [www.p2ric.org](http://www.p2ric.org)
- Peaks to Prairies Center/P2 Information Center: [www.peakstoprairies.org](http://www.peakstoprairies.org)
- Western Regional Pollution Prevention Network/P2 Information Center: [www.wrppn.org](http://www.wrppn.org)
- Pacific Northwest Pollution Prevention Resource Center: [www.pprc.org](http://www.pprc.org)
- P2 Gems: [www.p2gems.org](http://www.p2gems.org)
- P2Rx: [www.p2rx.org](http://www.p2rx.org)



Table 1. List of State Small Business Assistance Offices					
State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
AL	Small Business Assistance Program, Department of Environmental Management	(mhs@adem.state.al.us)	(800) 533-2336	www.adem.stat.al.us	Technical assistance
AL	Alabama Small Business Development Center	(sandefur@uab.edu)	(205) 943-6750	www.asbdc.org	Financial assistance
AK	Alaska Small Business Development Center	(anjaf@uaa.alaska.edu)	(800) 478-7232	www.aksbdc.org	Confidential business counseling, business training, resource library
AZ	Arizona Small Business Development Center	None provided	(480) 731-8720	www.dist.maricopa.edu/sbdc	One-on-one counseling and customized training
AR	Business Assistance Program, Department of Environmental Quality	James Gilson (jgilson@adec.state.ar.us)	(501) 682-0923	www.adeq.state.ar.us/custsvs/businesst.htm	Technical and compliance assistance, recognition programs
AR	Arkansas Small Business Development Center	(jmroderick@ualr.edu)	(501) 324-9043	www.ualr.edu/~sbdcddept	Business consulting, training, research
AR	Business Assistance Programs, Arkansas Department of Environmental Quality	(Help-CustSvs@adeq.state.ar.us)	(501) 682-0866 OR (888) 233-0326	www.adeq.state.ar.us/custsvs/businesst.htm	Technical assistance, expert resources
CA	Business Assistance Program, California Air Resources Board	(ombudsman@arb.ca.gov)	(800) 363-7664	www.arb.ca.gov/ba/ba.htm	Technical assistance
CO	Small Business Assistance Program, Department of Public Health and Environment	Nick Melliadis (nick.melliadis@state.co.us)	(303) 692-3172 OR (800) 866-7689 (In-state only)	www.cdphe.state.co.us/ap/sbap.asp	Technical assistance, Ombudsman



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CT	Small Business Assistance Program, Department of Environmental Protection	Tracy Babbidge (tracy.babbidge@po.state.ct.us)	(860) 424-3382	www.dep.state.ct.us/air2/smallbus.htm	Technical information and assistance and small-business advocacy
CT	Connecticut Small Business Development Center	None listed	(860) 486-4135 OR (860) 386-1581	www.sbdc.uconn.edu	Business development
DE	Business and Community Services, Department of Natural Resources and Environmental Control	None provided	(302) 739-6400	www.dnrec.state.de.us/dnrec2000/Admin/BusServ/BOSOff.htm	On-site assessments, permitting assistance, and guides and manuals
DE	Delaware Small Business Development Center	None provided	(302) 571-1555	www.delawaresbdc.org	Financial assistance
FL	Small Business Assistance Program, Department of Environmental Protection	None provided	None provided	www.dep.state.fl.us	Technical assistance, publications, training
FL	Florida Small Business Development Center	(fsbdc@uwf.edu)	(850) 595-6060	www.floridasbdc.com	Financial assistance
GA	Small Business Assistance Program	(adword@mail.dnr.state.ga.us)	(877) 427-6255	www.gasmallbiz.org	Technical assistance
GA	Georgia Small Business Development Center	(hlogan@sbdc.uga.edu)	(706) 542-6762	www.sbdc.uga.edu	Business and technical assistance
HI	Small Business Assistance, Department of Health	Marilyn Aguilar (maguilar@eha.health.state.hi.us)	(808) 586-4528	www.hawaii.gov/health/eh/cao/index.html	Technical information and assistance

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HI	Hawaii Small Business Development Center	(hbrl@hbrl-sbdc.org)	(808) 875-2402	www.brl.sbdc.org	Business research library, database research, demographics, monthly Small Biz Newsletter
ID	Small Business Assistance Program, Department of Environmental Quality	(starowsk@deq.state.id.us)	(208) 373-0502	www2.state.id.us/deq/assistance/sba/index.htm	Technical information and assistance
IL	Small Business Environmental Assistance Program – Department of Commerce and Community Affairs	(rjackson@commerce.state.il.us)	(217) 527-8909	www.commerce.state.il.us/doingbusiness/Reg_Env/EnvHome.htm	Technical assistance
IL	Illinois Small Business Development Center	(mpetrill@commerce.state.il.us)	(217) 524-5700	www.commerce.state.il.us/doingbusiness/First_Stop/SBDCServices.htm	Financial Assistance
IL	Office of Small Business, Illinois Environmental Protection Agency	(epa8140@epa.state.il.us)	(888) 372-1996	www.epa.state.il.us/small-business/index.html	Technical assistance
IN	Office of Pollution Prevention & Technical Assistance, Department of Environmental Management	Marc Hancock (mhancock@dem.state.in.us)	(800) 233-5627	www.state.in.us/idem/oppta	Technical assistance
IN	Compliance and Technical Assistance Program, Department of Environmental Management	Not provided	(800) 988-7901	www.state.in.us/idem/ctap/index.html	Educational workshops, confidential site visits, confidential phone assistance, public recognition, compliance assistance manuals, fact sheets

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IA	Iowa Department of Economic Development, Small Business Air Quality Liaison	Wendy Walker (wendy.walker@ided.stata.ia.us)	(515) 242-4761	www.iowasmart.com/services/assistance/airquality.html	None listed
KS	Small Business Environmental Assistance Program, Department of Health and Environment	(sbeap@ksu.edu)	(785) 9196 OR (800) 578-8898	www.sbeap.org	Technical assistance for material substitution, process optimization, waste minimization and recycling
KY	Kentucky Business Environmental Assistance Program	(kbeap@uky.edu)	(800) 563-2327	www.kbeap.org	Technical assistance, compliance assistance
KY	Kentucky Small Business Development Center	Lrnaug0@pop.uky.edu	(859) 257-7668	None provided	Financial assistance
LA	Small Business Assistance Program, Department of Environmental Quality	(assist@deq.state.la.us)	(888) 763-5424	www.deq.state.la.us/assistance/sbap	Technical assistance, advocacy, consulting
LA	Louisiana Small Business Development Center	(brrathbun@ulm.edu)	(318) 342-5506	www.lsbdc.net1.nul.edu	Clearinghouse and referral service
ME	Small Business Technical Assistance Program	Roy Krout (roy.t.krout@state.me.us)	(207) 287-8550	www.state.me.us/dep/oia/	Regulatory guidance and technical assistance
ME	Maine Small Business Development Center	(msbdc@usm.maine.edu)	(207) 780-4420	www.mainesbdc.org	Small business counseling and training

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State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
MD	Small Business Assistance Program, Department of Environment	(agosden@mde.state.md.us)	(410) 631-3772	www.mde.state.md.us/permit/sbap.html	Technical and financial assistance
MD	Maryland Technology Extension Service	(info@mcet.org)	(301) 934-7500	www.mcet.org	Technical assistance, training
MD	Maryland Technology Extension Service	Paul Gieta (pg26@umail.umd.edu)	(301) 405-8593	www.mtes.org	Technical assistance
MA	Massachusetts Small Business Development Center	(gep@msbdc.umass.edu)	(413) 545-6301	www.msbdc.som.umass.edu	Counseling, training, and technical assistance
MA	Waste Prevention Program, Department of Environmental Protection	Nancy Wrenn (nancy.wrenn@state.ma.us)	(617) 292-5586	www.state.ma.us/dep/bwp	Technical assistance and publications
MI	Michigan Small Business Development Center	(ron@misbdc.wayne.edu)	(313) 964-1798	www.michiganbdc.org	Financial assistance
MN	Small Business Program, Pollution Control Agency	None provided	(800) 657-3938	www.pca.state.mn.us/programs/sbap_p.html	Partnership-based compliance support, on- and off-site visits, workshops, loan information, promotion
MS	Small Business Assistance Program, Department of Environmental Quality	Jesse Thompson (jesse_thompson@dequ.state.ms.us)	(800) 725-6112	www.deq.state.ms.us/newweb/hompages.nsf	Technical assistance, on-site assessments, publications

**Table 1. List of State Small Business Assistance Offices**

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MO	Small Business Assistance Program, Department of Natural Resources	Byron Shaw (nrshawb@mail.dnr.state.mo.us)	(573) 526-6627	www.dnr.state.mo.us/deq/tap/smbus.htm	Multi-media technical assistance, on-site assessments
MT	Small Business Assistance Program, Department of Environmental Quality	(wnorton@state.mt.us) (brouse@state.mt.us) (Ombudsman)	(406) 444-3641	www.epa.gov/ttn/sbap	Technical assistance
MT	Montana Small Business Development Center	Ann Desch (Adesch@state.mt.us)	(406) 841-2746	www.commerce.state.mt.us	Technical assistance
NE	Small Business & Public Assistance Program, Department of Environmental Quality	Tom Franklin tom.franklin@ndeq.state.ne.us	(877) 253-2603	www.deq.state.ne.us	"One stop" technical assistance
NE	Nebraska Small Business Development Center, Manufacturing Extension Program	Rick Yoder (ryoder@unomaha.edu)	(402) 595-2381	www.nbdc.unomaha.edu	Environmental assistance
NV	Small Business Assistance Program, Division of Environmental Protection	(jgoodman@ndep.carson-city.nv.us)	(775) 687-4670	www.ndep.state.nv.us/sba/sba01.htm	Technical and financial assistance, on-site assessments
NV	Nevada Small Business Development Center	Kevin Dick (dick@unr.edu)	(702) 689-6677	www.nsbdc.org/env_program/pol_pr ev	On-site assessments, product/equipment information, economic evaluations, seminars
NH	Small Business Development Center	(aob@cisunix.unh.edu)	(603) 647-2622	www.nhsbdc.org	Financial assistance and environmental counseling

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State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
NH	Small Business Technical Assistance Program, Department of Environmental Services	(sbtap@des.state.nh.us)	(800) 837-0656 (In-state only) OR (603) 271-1379	None	None listed
NJ	Small Business Assistance Program, Department of Environmental Protection	Ky Asral (kasral@dep.state.nj.us)	(877) 753-1151 OR (609) 292-3600	www.state.nj.us/dep/opppc/sbat.htm	Technical and administrative support for pollution prevention
NJ	New Jersey Small Business Development Center	(bhopper@yourbizpartner.com)	(973) 353-1927	www.yourbizpartner.com	Counseling, training, information tools, and referrals
NJ	New Jersey Technical Assistance Program	Laura Battista (battista@megahertz.njit.edu)	(973) 642-7539	www.cees.njit.edu/njtap/	None listed
NM	New Mexico Small Business Development Center	None provided	(505) 428-1362 OR (800) 281-7232	www.nmsbdc.org	Business assistance, training, referrals
NY	Small Business Assistance Program	(SBAP@nysefc.org)	(800) 780-7227	www.nysefc.org/tas/SBAP/SBAP.htm	Environmental compliance assistance and on-site consultations
NC	North Carolina Small Business Development Center	(sdaugherty@sbtnc.org)	(919) 712-7272	www.sbtnc.org	Extensive in-depth business counseling and management education services
ND	Department of Health, Small Business Assistance Program	(tbachman@state.nd.us) (dmount@state.nd.us) (ombudsman)	(701) 328-5188	www.health.state.nd.us/ndhd/enviro n/ee	Technical assistance

**Table 1. List of State Small Business Assistance Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
ND	North Dakota Small Business Development Center	(ndsbdcc@sage.und.nodak.edu)	(701) 777-3225	www.ndsbdcc.org	One-on-one consultations, applied economic research, technical assistance, training
OH	Small Business Assistance Program, Ohio Environmental Protection Agency	Rick Carleski (rick.carleski@epa.state.oh.us)	(614) 644-4830	www.epa.state.oh.us/dapc/sba/sbaintro.html	One-on-one consultations and financial assistance
OH	Ohio Small Business Development Center	Bill Fioretti bill.fioretti@uc.edu	(513) 556-2072	www.ohiosbdcc.org	Business management consulting – free and confidential
OK	Small Business Assistance Program	Kyle Arthur (kyle.arthur@deq.state.ok.us)	(800) 869-1400 OR (405) 702-1000	None provided	Compliance assistance, advocacy
OK	Oklahoma Small Business Development Center	None provided	(580) 745-7577 OR (800) 522-6154	www.osbdcc.org	Consultation, workshops, financial assistance, referrals
OR	Business Assistance Program, Department of Environmental Quality	Jill Inahara (inahara.jill@deq.state.us)	(800) 452-4011, ext. 6147	www.deq.state.or.us/aq/BAP/index.htm	Technical assistance
OR	Oregon Small Business Development Center	Sandy Cutler (sandy_cutler@bizcenter.org)	(541) 345-6006	www.bizcenter.org	Business counseling and tools
PA	Small Business Assistance Program – ENVIROHELP	None provided	(800) 722-4743	www.pa-envirohelp.org	Technical assistance, site visits, publications, training

Table 1. List of State Small Business Assistance Offices					
State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
PA	Pennsylvania Small Business Development Center	(pasbdc@wharton.upenn.edu)	(215) 898-1219	www.pasbdc.org	Technical and financial assistance, information on energy conservation and waste reduction
PA	Pollution Prevention/Energy Efficiency Site Assessment Grant Program	None provided	(717) 783-9981	www.dep.state.pa.us/dep/deputate/pollprev/PEEC/default.htm	Provides grants to fund pollution prevention and energy efficiency assessments
PR <sup>‡</sup>	Small Business Assistance Program	(pr_sbap@hotmail.com)	(787) 294-0101	None provided	None provided
PR <sup>‡</sup>	Puerto Rico Small Business Development Center	(prsbdc@prsbdc.org)	(888) 300-7232	www.prsbdc.org	Financial and business assistance, training, and referrals
RI	Rhode Island Small Business Development Center	(jantonio@dem.state.ri.us)	(401) 232-6111	www.risbdc.org	Consulting and seminars
SC	Small Business Assistance Program, Department of Health and Environmental Control	None provided	(800) 819-9001	www.scdhec.net/sbap	Technical assistance, publications
SC	South Carolina Small Business Development Center	(pbarnes@univscvm.csd.sc.edu)	(803) 777-2126	www.sbdweb.badm.sc.edu	Environmental assistance
SD	Small Business Assistance Program, Department of Environment and Natural Resources	Joe Nadenicek (joe.nadenicek@state.sd.us)	(605) 773-4216	www.state.sd.us/denr/DES/AirQuality/aasmba.htm	Technical assistance
SD	South Dakota Small Business Development Center	(wdruin@usd.edu)	(605) 677-5287	None provided	Compliance and technical assistance



**Table 1. List of State Small Business Assistance Offices**

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TN	Small Business Environmental Assistance Program, Department of Environment and Conservation	(bgsbeap@state.tn.us)	(800) 734-3619	www.state.tn.us/environment/dca/sbeap/	Technical assistance, training
TN	Tennessee Small Business Development Center	(SBEAP@state.tn.us)	(615) 366-3900	www.tsbdc.org	Financial and technical assistance
TX	Small Business and Environmental Assistance, Texas Commission on Environmental Quality	(sbap@tnrcc.state.tx.us)	(800) 447-2827	www.tceq.state.tx.us/AC/about/organization/ed.html#3	On-site technical assistance
TX	North Texas Region Small Business Development Center	None provided	(214) 860-5831	www.ntsbdcc.org/	Business education
UT	Small Business Assistance Program, Department of Environmental Quality	(rreece@dequ.state.ut.us) (randerson@deq.state.ut.us) (Ombudsman)	(801) 536-4091	www.eq.state.ut.us	Compliance and technical assistance
UT	Utah Small Business Development Center	(FinnerMi@slcc.edu)	(801) 957-3493	None provided	Financial assistance
VA	Small Business Assistance Program, Department of Environmental Quality	None provided	(804) 698-4394 OR (800) 592-5482	www.deq.state.va.us/osba/smallbiz.html	Technical assistance
VA	Virginia Small Business Development Center	(rwilburn@dba.state.va.us)	(804) 371-8251	www.dba.state.va.us/smdev	Financial assistance

Table 1. List of State Small Business Assistance Offices					
State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
VT	Small Business Compliance Assistance Program	Judy Mirro (judy.mirro@anrmail.anr.state.vt.us)	(802) 241-3745 OR (800) 974-9559 (In-State only)	www.anr.sate.vt.us/dec/ead/eadhome/sbap.htm	Compliance assessments, information, and assistance
VT	Vermont Small Business Development Center	(pcrawfor@vtsbdc.org)	(802) 728-9101 OR (800) 464-7232 (In State Only)	www.vtsbdc.org	Counseling, environmental assistance, and training
WA	Small Business Assistance Program, Department of Ecology	(bbra461@ecy.wa.gov)	(360) 407-6803	www.ecy.wa.gov/programs/air/small_business_assistance.htm	Technical assistance and information
WA	Washington Small Business Development Center	None provided	(509) 358-7765	www.sbdc.wsu.edu	Training, research, technology development
WV	Small Business Assistance Program, Department of Environmental Protection	(fdurham@mail.dep.state.wv.us)	(304) 926-3647	www.dep.state.wv.us/	Technical Assistance
WV	West Virginia Small Business Development Center	None provided	(304) 558-2960 OR (888) 982-7232	www.wvsbdc.org	One-on-one consulting, financial assistance, workshops
WI	Small Business Clean Air Assistance Program	(tcoogan@commerce.state.wi.us)	(608) 267-9214	www.wienvirohelp.com	Technical assistance
WI	Wisconsin Small Business Development Center	Not provided	(608) 263-7794	www.cf.uwex.edu/sbdc	One-on-one counseling and workshops

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WY	Small Business Assistance Program	(dclark@state.wy.us)	(307) 777-7388	www.deq.state.wy.us/outreach.htm	Technical assistance
WY	Wyoming Small Business Development Center	(DDW@uwyo.edu)	(800) 348-5194	www.uwadmweb.uwyo.edu/sbdc	Financial assistance

<sup>†</sup>Contact listed on EPA website.

<sup>‡</sup>PR=Puerto Rico,

Table 2. List of State Agency Pollution Prevention Offices					
State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
AL	Pollution Prevention Unit, Department of Environmental Management	Gary Ellis	(334) 394-4352	<a href="http://www.adem.state.al.us/Education%20Div/P2%20Program/P2FactSheet.htm">www.adem.state.al.us/Education%20Div/P2%20Program/P2FactSheet.htm</a>	Technical assistance, industry sector fact sheets
AK	Pollution Prevention Program, Department of Environmental Conservation	Thomas Turner (thomas_turner@envi con.state.ak.us)	(907) 269-7586	<a href="http://www.state.ak.us/dec/prevhome.htm">www.state.ak.us/dec/prevhome.htm</a>	Sector-specific technical assistance, partnerships, workshops
AZ	Pollution Prevention Program, Department of Environmental Quality	Joseph Soesilo (js3@ev.state.az.us)	(602) 771-4205	<a href="http://www.adeq.state.az.us/envirom/waste/capdev/p2">www.adeq.state.az.us/envirom/waste/capdev/p2</a>	Pollution prevention planning assistance, environmental management systems, partnerships, training, on-site visits, publications, and website
CA	California Department of Toxic Substances Control, Office of Pollution Prevention	Kathy Barwick (kbarwick@dtsc.ca.gov)	(916) 255-6421	<a href="http://www.dtsc.ca.gov/Pollution_Prevention/indix.html">www.dtsc.ca.gov/Pollution_Prevention/indix.html</a>	Sector- and process-specific technical resources
CA	California Integrated Waste Management Board	(bzassist@ciwmb.ca.gov)	(916) 341-6613	<a href="http://www.ciwmb.ca.gov/BizWaste">www.ciwmb.ca.gov/BizWaste</a>	Technical assistance, training, awards, partnerships, waste exchanges
CA	California Environmental Protection Agency, Permit Assistance Centers	None provided	(800) 468-1787	<a href="http://www.calgold.ca.gov">www.calgold.ca.gov</a>	Business assistance with permit application and approval processes, compliance assistance, referrals to pollution prevention and other business assistance programs

**Table 2. List of State Agency Pollution Prevention Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
CO	Pollution Prevention Program, Department of Public Health and Environment	Margo Griffin (margo.griffin@state.co.us)	(303) 692-2979	www.cdphe.state.co.us/el/elp_p2home.asp	On-site assessments, telephone consultations, financial assistance, training, partnership program
CT	Office of Pollution Prevention, Department of Environmental Protection	Robert Kaliszewski (robert.kaliszewski@po.state.ct.us)	(860) 424-3003	www.dep.state.ct.us/wst/p2/	Technical information and assistance, small business advocacy
DE	Pollution Prevention Program, Department of Natural Resources and Environmental Control	Phil Cherry (pcherry@dnrec.state.de.us)	(302) 739-4403	www.dnrec.state.de.us/dnrec2000/p2/p2home.htm	Pollution prevention guides for specific industry sectors and pollution prevention success stories
DC <sup>+</sup>	D.C. Department of Health	Olivia Achuko (noa@mail.environ.state.dc.us)	(202) 53502997	www.dchealth.com	None listed
DC <sup>+</sup>	Environmental Health Administration, Bureau of Environmental Quality	None provided	(202) 645-6080, ext. 3079	www.environ.state.dc.us	Technical assistance, publications
FL	Florida Pollution Prevention Program, Department of Environmental Protection	Julie Abcarian (julie.abcarian@dep.fl.state.us)	(850) 245-8807	www.dep.state.fl.us/waste/categories/p2	Technical assistance, on-site assessments, training and publications
GA	Pollution Prevention Assistance Division, Department of Natural Resources	(info@p2ad.org)	(404) 651-5130	www.p2ad.org	Technical assistance, on-site assessments, industry-sector information
HI	Waste Minimization Project, Department of Health	Marilyn Aguilar (maguilar@eha.health.state.hi.us)	(808) 586-4240	www.state.hi.us/dbedt/ert/chc/brg97.html	Technical assistance (hazardous waste)

**Table 2. List of State Agency Pollution Prevention Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
ID	Pollution Prevention Program, Department of Environmental Quality	Patti Best (pbest@deq.state.id.us)	(208) 373-0502	www2.state.id.us/deq/assistance/p2. htm	Sector-specific and technical information
IL	Illinois Environmental Protection Agency – Office of Pollution Prevention	Kevin Greene (epa8603@epa.state.il. us)	(217) 785-0833	www.epa.state.il.us/p2/index.html	Partnerships, technical assistance, community outreach
IA	Pollution Prevention and Waste Reduction Assistance Program, Department of Natural Resources	Scott Vander Hart (scott.vanderhart@dnr. state.ia.us)	(515) 281-4367	www.state.ia.us/dnr/organiza/wmad /wmabureau/pollution/index.htm	Information and on-site assistance
KS	Office of Planning & Prevention, Department of Health & Environment	Janet Neff (jneff@kdhe.state.ks.us )	(785) 296-0669	www.kdhe.state.ks.us/sbcs/index.ht ml	Technical assistance, awards program, newsletter, resource links
KS	Bureau of Environmental Field Services, Department of Health and Environment	Cathy Colglazier	None provided	None provided	Technical assistance, newsletter, resource links
KY	Kentucky Department of Environmental Protection	Matt Hackathorn (matthew.hackathorn@ mail.state.ky.us)	(502) 564-6716	www.dep.ky.gov/default.htm	None listed
KY	Kentucky Pollution Prevention Center	Cam Metcalf (jcmetc01@gwise.louis ville.edu)	(502) 852-0965	www.kppc.org	Technical assistance, on-site assessments, training, applied research
LA	Department of Environmental Quality, Assistance	(assist@deq.state.la.us)	(225) 765-0219	www.deq.state.la.us/assistance/sbap /index.htm	Technical assistance

**Table 2. List of State Agency Pollution Prevention Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
ME	Office of Innovation and Assistance	Peter Cooke (peter.cooke@maine.gov)	(207) 287-7100	www.state.me.us/dep/oia/	Compliance and pollution prevention assistance
MD	Pollution Prevention Program, Department of Environment	Laura Armstrong (larmstrong@mde.state.md.us)	(410) 537-4158	www.mde.state.md.us/BusinessInfo Center/PollutionPrevention/P2/index.asp	Technical assistance, industry sector information, case studies, Environmental Management System implementation assistance, recognition
MA	Executive Office of Environmental Affairs, Office of Technical Assistance	Paul Richard (paul.richard@state.ma.us)	(617) 626-1042	www.state.ma.us/ota	Pollution prevention assistance and outreach, technology support
MA	MA Executive Office of Environmental Assistance – STEP Program	Linda Benevides (linda.benevides@state.ma.us)	(617) 626-1197	www.state.ma.us/ota/support/step.htm	None listed
MI	Pollution Prevention Section, Department of Environmental Quality	(Horanm@michigan.gov)	(517) 373-9122	www.michigan.gov/deq/o,1607%207-135-3585---,00.html	Financial assistance information, on-site technical assistance, reference materials
MN	Office of Environmental Assistance	David Cera (david.cera@moea.state.mn.us)	(651) 215-0240	www.moea.state.mn.us/berc/index.htm	Phone assistance and referrals, printed materials, workshops, financial assistance, recognition and promotion of success stories

**Table 2. List of State Agency Pollution Prevention Offices**

State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
MN	Pollution Prevention and Sustainability Program, Pollution Control Agency	Cindy Hilmoie (cynthia.hilmoie@pca.state.mn.us)	(612) 296-7783	www.pca.state.mn.us/programs/p2-s/index.htm	Technical assistance
MS	Environmental Resource Center, Department of Environmental Quality	Thomas E. Whitten (tom_whitten@deq.state.ms.us)	(601) 961-5241	www.deq.state.ms.us/newweb/homepages.nsf	Technical assistance, on-site assessments, publications
MO	Environmental Assistance Office, Department of Natural Resources	David Goggins (nrgoggd@mail.state.mo.us)	(573) 526-6627 OR (800) 361-4827	www.dnr.mo.us/oac/smbus.htm	Multi-media on-site assessments, awards program
MT	Pollution Prevention Bureau, Department of Environmental Quality	(lmoore@state.mt.us)	(406) 444-6697	www.deq.state.mt.us	Technical assistance
MT	Montana Pollution Prevention Program	Michael T. Vogel (mvogel@montana.edu)	(406) 994-5417	www.montana.edu/wwwated	Technical assistance, materials exchange, recognition program, self-assessment checklists
NE	Pollution Prevention Program, Department of Environmental Quality	Stephanie Vap-Morrow (stephanie.vap-morrow@ndeq.state.ne.us)	(402) 471-7784	www.deq.state.ne.us/	Technical assistance, on-site assessments
NH	Pollution Prevention Program, Department of Environmental Services	Stephanie D'Agostino (s_dagostino@des.state.nh.us)	(603) 271-6398	www.des.state.nh.us/nhppp	Technical assistance, on-site assessments, awards programs



**Table 2. List of State Agency Pollution Prevention Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
NM	Environment Department	Zia Green (green_zia@nmenv.state.nm.us)	(800) 219-6157	www.nmenv.state.nm.us/green_zia_website/index.htm	Technical assistance, publications
NY	Pollution Prevention Unit, Department of Environmental Conservation	Mary Werner (mhwerner@gw.dec.state.ny.us)	(518) 402-9469	www.dec.state.ny.us/website/ppu	Technical assistance, workshops, publications, and referrals
NC	Division of Pollution Prevention and Environmental Assistance, Department of Environment and Natural Resources	Gary Hunt (gary_hunt@owr.ehnr.state.nc.us)	(919) 715-6500 OR (800) 763-0136	www.p2pays.org	Technical assistance, on-site assessments, publications
NC	Department of Environment and Natural Resources, Customer Service Center	(denr.csc@ncmail.net)	(877) 623-6748	www.envhelp.org	Permit and regulatory assistance
ND	Department of Health, Division of Waste Management, Pollution Prevention	(rtubbs@state.nd.us)	(701) 328-5266	www.health.state.nd.us/ndhd/enviro n/wm/p2/index.htm	Information and assistance
OH	Office of Pollution Prevention, Environmental Protection Agency	Michael Kelley (Michael.Kelley@epa.state.oh.us)	(614) 644-2807	www.epa.state.oh.us/opp	Technical and financial information assistance, materials exchange, on- site assessments
OK	Pollution Prevention Programs, Department of Environmental Quality	Dianne Wilkins (dianne.wilkins@deqmail.state.ok.us)	(405) 702-9128	www.deq.state.ok.us/CSDnew/p2.htm	Training, recognition programs, clearinghouse of P2 technologies, methods, and techniques

**Table 2. List of State Agency Pollution Prevention Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
OR	Pollution Prevention Program, Department of Environmental Quality	Marianne Fitzgerald (fitzgerald.marianne@deq.state.or.us)	(503) 229-5946	www.deq.state.or.us/programs/p2/p2.htm	Education, assistance
PA	Office of Pollution Prevention & Compliance Assistance, Department of Environmental Protection	Eric Thumma (thumma.eric@dep.state.pa.us)	(717) 783-0542	www.dep.state.pa.us/dep/deputate/pollprev/pollution_prevention.html	Partnerships, workshops, financial assistance, one-on-one consultation
PR <sup>†</sup>	Puerto Rico Department of Environment	Carlos Gonzales	(809) 765-7517 x 381	None provided	Technical assistance
RI	Office of Technical & Customer Assistance, Department of Environmental Management	Richard Enander (renander@dem.state.ri.us)	(401) 222-6822 ext. 4411	www.state.ri.us/dem/programs/benviron/assist/pollut.htm	On-site assessments, training seminars, and compliance assistance
SC	Center for Waste Minimization, Department of Health and Environmental Control	Robert Burgess (burgessre@columb30.dhec.state.sc.us)	(803) 896-8986	www.scdhec.net/eqc/admin/html/wastemin.html	Technical assistance, publications
SD	Pollution Prevention Program, Department of Environment and Natural Resources	Dennis Clarke (Info@denr.state.sd.us)	(605) 773-4254	www.state.sd.us/denr/DFTA/WaershedProtection/P2/P2.htm	Technical assistance
TN	Pollution Prevention Program, Department of Environment and Conservation	Karen Grubbs (kgrubbs@mail.state.tn.us)	(615) 532-0463	www.state.tn.us/environment/dca	Technical assistance, publications
TX	Pollution Prevention Program, Natural Resources Conservation Commission	Ken Zarker (kzarker@tnrcc.state.tx.us)	(512) 239-3144	www.tnrcc.state.tx.us/exec/sbea/p2tech.html	On-site assessments, clearinghouse of best practices, partnership program, and industry-specific resources.

**Table 2. List of State Agency Pollution Prevention Offices**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
UT	Pollution Prevention Program, Department of Environmental Quality	Sonja Wallace (swallace@deq.state.ut. us)	(801) 536-4477	www.eq.state.ut.us/eoas/poll_prev	Technical assistance, awards program, training
VT	Compliance Assistance and Pollution Prevention Programs, Agency of Natural Resources	Gary Gulka (garyg@dec.anr.state.vt .us)	None listed	www.anr.state.vt.us/dec/ead/eadho me/p2.htm	Technical and financial assistance, workshops, training, and research
VI <sup>†</sup>	Department of Planning and Natural Resources	None provided	(340) 774-3320	www.dpnr.gov.vi	None listed
VA	Office of Pollution Prevention, Department of Environmental Quality	Sharon K. Baxter (skbaxter@deq.state.va .us)	(804) 698-4344	www.deq.state.va.us/p2	Technical assistance and materials
WA	Pollution Prevention Program, Department of Ecology	Lynn Helbrecht (lhel461@ecy.wa.gov)	(360) 407-6760	www.ecy.wa.gov/programs/hwtr/p2 /index.html	Education, technical assistance, expert contact list
WV	Office of Waste Reduction, Industrial Assistance, Pollution Prevention Services, Department of Environmental Protection	Leroy Gilbert (lgilbert@hotmail.com)	(304) 465-0034	www.dep.state.wv.us/p2	Technical assistance

Table 2. List of State Agency Pollution Prevention Offices					
State	Agency	Contact <sup>†</sup> (E-mail)	Phone Number <sup>†</sup>	Agency Web Site	Services Provided
WI	Cooperative Environmental Assistance, Department of Natural Resources	Lynn Persson	(608) 267-3763	<a href="http://www.dnr.state.wi.us/org/caer/cea">www.dnr.state.wi.us/org/caer/cea</a>	Sector specialists, environmental management system resources, publications
WY	Office of Outreach & Environmental Assistance, Department of Environmental Quality	Stephen Roseberry (sroseb@state.wy.us)	(307) 777-6105	<a href="http://www.deq.state.wy.us/outreach.htm">www.deq.state.wy.us/outreach.htm</a>	Technical assistance, pollution prevention opportunity assessment, planning

<sup>†</sup>Contact listed on EPA website.

\*DC=District of Columbia. PR=Puerto Rico. VI=Virgin Islands

**Table 3. List of Local Pollution Prevention Programs**

<b>State</b>	<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
KS	Wichita-Sedgwick County Department of Community Health	None provided	(316) 268-8457	www.wscdch.org	None listed
MO	Choose Environmental Excellence – Gateway Region	(info@ceeegr.org)	(314) 962-4100	www.ceeegr.org	None listed
NE	Lincoln-Lancaster County Health Department (LLCHD)	(prooney@ci.lincoln.ne.us)	(402) 441-8644	www.ci.lincoln.ne.us/city/health/enviro n/index.htm	Technical assistance covering materials or process changes or substitutions, research, training, seminars, Title V air permitting, hazardous waste collection and response
NY	Erie County Department of Environment and Planning, Office of Pollution Prevention	(nersey@cdbg.co.erie.ny.us)	(716) 858-7674	www.erie.gov/environment/compliance/ ofcpp.phtml	On-site consultations and workshops
NY	New York City WasteLe\$\$	(web@nycwasteless.org)	(917) 237-5673	www.nycwasteless.org	Partnerships, sector-specific technical assistance, and case studies.
RI	Narragansett Bay Commission Pollution Prevention Program	James McCaughey (jmccaughey@narrabay.com)	(401) 461-8848 ext 352	www.narrabay.com/pollprevent.asp	Technical assistance and regulatory relief program

<sup>†</sup>Contact listed on EPA website.

<b>Table 4. List of EPA Pollution Prevention Offices by EPA Region</b>				
<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number<sup>†</sup></b>	<b>Agency Web Site</b>	<b>Services Provided</b>
<i><b>Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)</b></i>				
EPA New England Pollution Prevention Coordinators	Robert Guillemín (guillemín.robert@epa.gov)	(617) 918-2023	<a href="http://www.epa.gov/region1/assistance/p2/p2resources.html">www.epa.gov/region1/assistance/p2/p2resources.html</a>	Information, contacts, resources
New England Environmental Assistance Team (NEEAT)	Linda Darveau (darveau.linda@epa.gov)  Mary Dever (dever.mary@epa.gov)	(888) 372-7341 (in New England) OR (617) 918-1111	<a href="http://www.epa.gov/NE/assistance/neeat/muni/index.html">www.epa.gov/NE/assistance/neeat/muni/index.html</a>	Sector-based P2 and compliance assistance
<i><b>Region 2 (New York, New Jersey, Puerto Rico, US Virgin Islands)</b></i>				
EPA Region 2, Division of Environmental Protection and Planning, Pollution Prevention Team	Tristan Gillespie (gillespie.tristan@epa.gov) OR Kathleen Malone (malone.kathleen@epa.gov)	(212) 637-3753 (Tristan) OR (212) 637-4083 (Kathleen)	<a href="http://www.epa.gov/region2/p2/p2home.htm">www.epa.gov/region2/p2/p2home.htm</a>	Resources, networking, and grants program
EPA Region 2, Division of Enforcement and Compliance Assistance	Ronald Lockwood (lockwood.ronald@epa.gov)	(212) 637-3413	<a href="http://www.epa.gov/region2/p2/p2home.htm">www.epa.gov/region2/p2/p2home.htm</a>	Resources, workshops, and grants program
EPA Region 2, Division of Environmental Protection and Planning, Solid Waste Programs	Lorraine Graves (graves.lorraine@epa.gov)	(212) 637-3730	No link provided	Resources, networking, and technical assistance
Caribbean Basin Pollution Prevention Resources Exchange Center	None provided	(787) 751-0239	None provided	None listed

**Table 4. List of EPA Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
<b><i>Region 3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)</i></b>				
EPA Region 3, Pollution Prevention Program	Jeff Burke (burke.jeff@epa.gov) OR Lorna Rosenberg (rosenber.lorna@epa.gov)	(215) 814-2761	<a href="http://www.epa.gov/reg3p2p2/">www.epa.gov/reg3p2p2/</a>	Technical assistance, partnership programs, and waste exchanges
EPA Region 3, Business Assistance Center	None provided	(215) 814-2761	<a href="http://www.epa.gov/region3/sbac">www.epa.gov/region3/sbac</a>	Technical assistance, technology development, and small-business liaison
<b><i>Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)</i></b>				
EPA Region 4, Pollution Prevention Program	Dan Ahren (ahren.dan@epa.gov)	(404) 562-9028	<a href="http://www.epa.gov/region4/air/polprev.htm">www.epa.gov/region4/air/polprev.htm</a>	Resources and contacts
<b><i>Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)</i></b>				
EPA Region 5, Pollution Prevention Program	Phil Kaplan (kaplan.phil@epa.gov)	(312) 353-4669	<a href="http://www.epa.gov/reg5rcra/wptdiv/p2pages/index.htm">www.epa.gov/reg5rcra/wptdiv/p2pages/index.htm</a>	Technical assistance
<b><i>Region 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)</i></b>				
EPA Region 6, Pollution Prevention Program	Eli Martinez (martinez.eli@epa.gov) OR Joy Campbell (campbell.joy@epa.gov)	(214) 665-2119  OR (214) 665-8036	<a href="http://www.epa.gov/earth1r6/6en/xp/enxp2d.htm">www.epa.gov/earth1r6/6en/xp/enxp2d.htm</a>	Technical assistance and resources

Table 4. List of EPA Pollution Prevention Offices by EPA Region				
Agency	Contact† (E-mail)	Phone Number†	Agency Web Site	Services Provided
<i>Region 10 (Alaska, Idaho, Oregon, Washington)</i>				
EPA Region 10, Pollution Prevention Program	Carolyn Gangmark (gangmark.carolyn@epa.gov)	(206) 553-4072	www.epa.gov/p2/assist/region10.pdf	Technical assistance
	Robert Drake (drake.robert@epa.gov)	(206) 553-4803		

†Contact names supplied by EPA website.



**Table 5. List of Other Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact† (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
<i><b>Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)</b></i>				
New England Environmental Assistance Team NEEAT)	Linda Darveau (darveau.linda@epa.gov)  Mary Dever (dever.mary@epa.gov)	(888) 372-7341 (in New England) OR (617) 918-1111	www.epa.gov/NE/assistance/neeat/muni/index.html	Sector-based P2 and compliance assistance
Northeast States Pollution Prevention Roundtable/P2 Information Center	Andy Bray	(617) 367-8558 ext. 306	www.newmoa.org	Contact information and technical assistance
Northeast Management Officials' Association (NEWMOA)	Terri Goldberg (newmoa@aol.com)	(617) 367-8558	www.newmoa.org	Hazardous waste, solid waste, waste site cleanup and pollution prevention program
Toxics Use Reduction Institute	(clarkjan@turi.org)	(978) 934-3346	www.turi.org	Technical assistance, publications, and education
<i><b>Region 3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)</b></i>				
Department of Environmental Programs, Metropolitan Washington Council of Governments (MWCOC)	None provided	None provided	www.mwcog.org/dep/index.htm	None listed

**Table 5. List of Other Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
<i>Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)</i>				
Waste Reduction Resource Center/P2 Information Center	John Calcagni (John)Calcagni@p2pays.org	(919) 715-6534	www.wrrc.p2pays.org	Technical assistance, industry sector information, publications, on-site training and assessments, publications, and case studies
University of Tennessee Center for Industrial Services	None provided	(615) 532-8657	www.cis.utk.edu	Technical assistance, publications, training
<i>Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)</i>				
Great Lakes Regional Pollution Prevention Roundtable/P2 Information Center	(djacobso@wmrc.uiuc.edu)	(630) 472-5019	www.glrppr.org	Technical assistance, publications
Illinois Waste Management and Research Center	George VanderVelde (gwelde@wmrc.uiuc.edu)	(217) 333-8569	www.wmrc.uiuc.edu	Technical assistance, industry experts, research funding, partnerships, workshops, public recognition, environmental management systems
Indiana Clean Manufacturing Technology & Safe Materials Institute, Purdue University	Jim Noonan (noonan@ecn.purdue.edu)	(765) 463-4749	www.ecn.purdue.edu/CMTI	Sector-specific technical resources, on-site training, environmental management systems and technology transfer information

**Table 5. List of Other Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
Minnesota Technical Assistance Program	Cindy McComas (mccom003@tc.umn.edu)	(612) 624-1330	www.mntap.umn.edu	Site visits, industry experts environmental management system consulting, materials exchange network
Minnesota Technology, Inc.	Kevin O'Donnell (kodonnell@mail.mntech.org)	(612) 672-3446	www.minnesotatechnology.org	Not listed
Center for Environment and Energy – CEE	Not provided	(414) 227-3160	www1.uwex.edu/ces/shwec	On-site and over-the-phone assessments, training, environmental management system development, publications
<i>Region 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)</i>				
Southwest Pollution Prevention Information Center/P2 Information Center	(raulg@utep.edu)	(915) 747-6273	www.p2.utep.edu	Technical assistance, training, environmental management systems consulting, publications
Clean Texas	Rob Borowski (rob@cleantexas.org)	(512) 239-3187	www.cleantexas.org	None listed
Gulf Coast Hazardous Substance Research	Jack Hopper (jhopper@ALMARK.lamar.edu)	(409) 880-8785	www.gchsrc.lamar.edu	None listed
Lower Colorado River Authority	Charles Urdy (charles.urdy@lcra.org)	(512) 473-3200	www.lcra.org	None listed

**Table 5. List of Other Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
<i>Region 7 (Iowa, Kansas, Missouri, Nebraska)</i>				
Region 7 Pollution Prevention Regional Information Center (P2RIC)/P2 Information Center	Rick Yoder (ryoder@unomaha.edu)	(402) 595-2381	www.p2ric.org	Environmental assistance
Iowa Waste Reduction Center	John Konefes (john.konefes@uni.edu)	(319) 273-8905	www.iwrc.org	Environmental assistance through research, education, and training
Recycle Iowa	(recycleiowa@ided.state.ia.us)	(800) 532-4776	www.recycleiowa.org	Technical and business waste reduction assistance, waste exchange services
Hazardous Materials Training & Research Institute	(dfeil@kirkwood.cc.ia.us)	(319) 398-5678	www.hmtri.org	Environmental health and safety education and training
Kansas State University Pollution Prevention Institute	Sherry Davis (sdavid@oz.oznet.ksu.edu)	(800) 578-8898	www.sbeap.org/ppi/about.asp	Technical assistance, publications, videos, other resources
Mid-America Manufacturing Technology Center (MAMTC)	(abrown@midusa.net)	(620) 276-9505	www.mamtc.com	Offers manufacturers high- quality, low-cost consultation that leads to bottom line results
Bridging the Gap	(kay@bridgingthegap.org)	(816) 561-1087	www.bridgingthegap.org	Partnerships, waste prevention, environmental education, business recycling

**Table 5. List of Other Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact* (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
University of Missouri Outreach & Extension Office of Waste Management	(owm@missouri.edu)	(417) 889-5000	www.outreach.missouri.edu.owm/	Education, information, technical assistance
Nebraska Materials Exchange Program	(exchange@knb.org)	(800) 486-4562 OR (402) 486-4622	www.knb.org/exchange.html	Waste exchange, recycling
UNL Biological Systems Engineering	(JHYGNSTROM1@UNL.EDU)	(402) 472-9614	www.p2.unl.edu	Technical assistance, educational materials, programs
<b><i>Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)</i></b>				
Peaks to Prairies Center/P2 Information Center	(information@peakstoprairies.org)	(406) 994-3451	www.peakstoprairies.org	Technical and financial assistance, publications, training
Midwest Assistance Program, Inc. (MAP)	(map1@bevcomm.net)	(402) 846-5123	www.map-inc.org	On-site technical assistance, publications, training
Colorado State University Industrial Assessment Center	(koz@lamar.colostate.edu)	(970) 491-7709	www.engr.colostate.edu/deps.me/progr m/outreach/iac	On-site assessments
<b><i>Region 9 (Arizona, California, Hawaii, Nevada)</i></b>				
Western Regional Pollution Prevention Network (WRPPN) /P2 Information Center	(wrppn@wrppn.org)	(775) 689-6675	www.wrppn.org	Sector-specific information, listserv, website, pollution prevention roundtable, publications, technical assistance from retired engineers

**Table 5. List of Other Pollution Prevention Offices by EPA Region**

<b>Agency</b>	<b>Contact<sup>†</sup> (E-mail)</b>	<b>Phone Number†</b>	<b>Agency Web Site</b>	<b>Services Provided</b>
Business Environmental Program, University of Nevada, Reno	Kevin Dick (dick@unr.edu)	(775) 689-6677	None provided	Technical assistance, on-site assessments, product information, seminars
<i>Region 10 (Alaska, Idaho, Oregon, Washington)</i>				
Pacific Northwest Pollution Prevention Resource Center/P2 Information Center	(office@pprc.org)	(206) 352-2050	www.pprc.org	Technical assistance, referral, clearinghouse of pollution prevention case studies and research

<sup>†</sup>Contact names listed on EPA website.









### Could your family be affected?

In 1996 there were approximately 125,000 nail salons in the United States, employing over 500,000 nail technicians with total sales of over 4.5 billion dollars.

— Indoor Air Pollution  
Control

30 states have restricted or banned the use of liquid methyl methacrylate monomer. Methyl methacrylate monomer is an ingredient used in some artificial nail products which bond strongly with the nail.

— U.S. EPA

U.S. nail salons raked in \$6.53 billion in revenue in 2003, up 67 percent from 10 years ago.

— Design for the Environment



## OWNER/OPERATOR INFORMATION SHEET

3/26/2007

### Reducing Air Pollution from: Nail Salons

#### Why should I reduce air pollution from nail salons?

People who are exposed to toxic air pollutants, at sufficient concentrations for sufficient durations, may increase their chances of getting cancer or experiencing other serious health effects, such as reproductive problems, birth defects, and aggravated asthma.

Pollution prevention safeguards the health of your employees, families, and customers by using materials, processes, or practices that can reduce or eliminate air pollution at the source.

Pollution prevention practices also save money on waste disposal, solvent usage, and the cost of air pollution controls.

You may already be regulated by federal, state, local, and Tribal agencies and may already voluntarily implement pollution prevention practices. These practices can go beyond compliance and further minimize impacts on human health and the environment.

#### Why should I be concerned about air pollution from my nail salon?

Many of the products used in nail salons contain a variety of chemicals which may be harmful to people or to the environment if not handled carefully. These products include solvents, hardeners, fragrances, glues, polishes and dry/curing agents. Possible effects on health can range anywhere from mild rashes to very serious conditions, depending on degree and duration of exposures (For more detailed information on chemicals present in nail care products, see (7), (1) and (3) in Resources list.)

- **Chemical Vapors:** Many of the most potentially harmful chemicals used in nail salon products "vaporize" quickly into the air while customers are being worked on, or when materials are being transferred from storage into smaller containers.

Chemicals in solvents can also react in the air to cause both respiratory and environmental problems from production of ground-level ozone (smog). Since smell is not a reliable indicator of exposure, it's important to know which products contain chemicals that owners and operators need to treat with special care.

- **Dust:** Filing artificial nails produces fine particles. The resulting dust may contain glues, benzoyl peroxide, silica, and methacrylate polymers. Wraps usually contain the same materials as nails in any given product line.
- **A Special Situation:** Years ago, Liquid Methyl Methacrylate (MMA) Monomer was used in artificial nail products. In the early 1970's the US Food and Drug Administration (FDA) responded to complaints with investigations that established its dangers. Since then, 30 states have restricted or banned its use. However, Liquid MMA is still available and is used in some products. In (6) of the Resources list, the Nail Manufacturers Council (NMC) provides information about how to identify Liquid MMA and describes safe products to use as substitutes.
- **Other Health Considerations:** In addition to trying to minimize the health effects of breathing chemical vapors and dust, nail salon owners and operators can protect worker and customer health in other ways. Establishing good sanitation practices for instrument sterilization, hand washing and glove use can prevent disease transmission. See listed resources for excellent suggestions and checklists, including ways to prevent accidents in nail salons.

# OWNER/OPERATOR INFORMATION SHEET

## Nail Salons

3/26/2007

### How can I reduce the air pollution from my nail salon?

- **Learn about the chemicals in the products you use:** You can get Material Safety Data Sheets (MSDS) from your nail product suppliers and manufacturers. Each MSDS tells what the hazardous components and exposure limits are for the chemicals in each of their products. They explain any health hazards, precautions to be taken, and what to do in emergencies. For more information about using MSDS, see Resources (7) and (4).
- **Minimize effects of vapors:** Try to prevent vapors from getting into the air by keeping supplies tightly sealed except when dispensing products. Guard against spills when transferring materials from storage to smaller containers. Substitute safe materials and products. Promptly dispose of chemical-soaked gauze pads into sealed bags and change trash can liners daily. Use only metal self-closing trash receptacles.
- **Minimize effects of dust:** Workers should wear masks when filing nails. Dust-controlling techniques, such as forming the nail properly, should be used to reduce the need for filing.
- **Ventilate to remove vapors and dust:** Nail salons should have a well-designed, properly installed, overall exhaust ventilation system. Install a local exhaust ventilation system above each manicure station. All systems should be vented outside in a

manner that avoids re-circulating air back into the salon.

For more detailed information, links to other Web sites, and helpful checklists dealing with all aspects of nail salon health and safety measures, see the list of Resources.

### What else can I do to reduce air pollution?

Keep informed through internet resources such as those listed. Stay involved with trade associations, which offer updates, publications, and continuing education opportunities.

Your community may already have groups working for cleaner air. Your expertise and knowledge can be very helpful to these groups by helping them understand what the nail salon industry is doing to improve air quality.

Many pollution prevention offices offer free on-site assessments for interested businesses. Resource (9) provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and cost-saving opportunities.

Also, sponsor employee awards for good ideas, great efforts and dedication to pollution prevention. For example, you could provide a cash award for employees who implement ideas that reduce both costs and pollution.

## Resources

EPA has compiled an information booklet to educate nail salon owners and employees about the potential hazards of chemicals present in nail products and to recommend many best shop practices to minimize health and environmental risks in their shops. This booklet has been produced in English, Vietnamese, and Korean to ensure that stakeholders from different backgrounds are all equally educated on nail salon risks and safety measures. Resource (7). Other resources listed also provide useful information, links, and work practices checklists for nail salons. See additional checklists in (1) and (5).

1. Artificial Fingernail Products. A HESIS Guide to Chemical Exposures in the Nail Salon: [www.dhs.ca.gov/ohb/HESIS/artnails.htm](http://www.dhs.ca.gov/ohb/HESIS/artnails.htm)
2. Cosmetic, Toiletry, and Fragrance Association: [www.ctfa.org](http://www.ctfa.org), 202-331-1770
3. Integrated Risk Information Systems (IRIS): [www.epa.gov/iris](http://www.epa.gov/iris)
4. Material Safety Data Sheets: [www.msds-online.com](http://www.msds-online.com)
5. Nail Manufacturers Council List of Salon Work Practices: [www.asepticonails.com/nailsafety.htm](http://www.asepticonails.com/nailsafety.htm)
6. Nail Manufacturers Council Update on MMA: [www.isnow.com/about/inta/NMC\\_MMA.pdf](http://www.isnow.com/about/inta/NMC_MMA.pdf)
7. U.S. EPA: A Guide to Protect the Health of Nail Salon Workers and their Working Environment: [www.epa.gov/dfe/pubs/salon/NailBookEnglish.pdf](http://www.epa.gov/dfe/pubs/salon/NailBookEnglish.pdf), 888-884-2478 x58326
8. U.S. EPA Design for the Environment Nail Salon Project: [www.epa.gov/dfe/projects/salon/index.htm](http://www.epa.gov/dfe/projects/salon/index.htm)
9. US EPA Small Business Gateway homepage: [www.epa.gov/smallbusiness/](http://www.epa.gov/smallbusiness/)
10. Community-Based Projects: [www.epa.gov/air/toxicair/community.html](http://www.epa.gov/air/toxicair/community.html)

