HEALTHY AIR
A COMMUNITY AND BUSINESS LEADERS GUIDE

Reducing Air Pollution from: Metal Operations

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

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*. 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

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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

Resources

- National Association of Metal Finishers: *www.namf.org,* (407) 281-6445
- EPA Air Toxics Web Site: *www.epa.gov/ttn/atw/*
- Community-Based Projects: www.epa.gov/air/toxicair/community.html
- Owner Operator Information Sheet for Electroplating Operations
- Assessment and guidance: *www.ecy.wa.gov/pubs/99412.pdf*
- Good operating practices: *dep.state.ct.us/wst/p2/industry/p2options.pdf*
- Pollution prevention opportunities and impediments: *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*

EPA's Sector Strategies Partnership Program

- EPA's Sector Strategies Partnership Program for the Metal Finishing Sector: *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,* (202) 566-1407

Environmental Management Systems

- Metal Finishing Sector: www.epa.gov/sectors/metalfinishing/ems.html#ems
- Metal Casting Sector: www.epa.gov/sectors/metalcasting/ems.html#diecastems

Sector Notebooks

- Fabricated Metal Products Sector Notebook: *www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/fabmetsn.pdf*
- Metal Casting Industry Sector Notebook: *www.epa.gov/compliance/resources/publications/assistances/sectors/notebooks/metcstsna.pdf*

Topic Hubs

- Pollution Prevention Resource Center: *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*

Toxicity of Solvents

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