Waste Reduction/ Pollution Prevention
Checklist and Glossary

Fact Sheet

Waste Reduction/Pollution Prevention

Checklist and Glossary

While opportunities for reducing waste and preventing pollution are limitless, a few tried and true methods are presented here. Keep in mind that any waste or pollution created by your facility cuts into profits, reduces operation efficiency, may involve worker safety issues and could require regulatory involvement. Pollution prevention and waste reduction efforts can increase business profitability. Pollution and waste include everything from paper being thrown in the waste basket to air emissions going up the stack and discharges going to the local treatment facility.

The follow areas are covered in this fact sheet:

- **Cafeterias and Restaurants**
- **Office Areas**
- **Cleaning and Degreasing Operations**
- **Production Lines**
- **Coating and Painting Operations**
- **Shipping and Receiving Areas**
- **Energy Conservation**
- **Water Use and Conservation**
- **Leak and Spill Prevention**
- **Maintenance and Storage Areas**
- **Material Handling**

Choose the categories in this checklist that are most applicable to you; don't feel that you must do everything at once. Start with key areas of opportunity such as solvent recovery or corrugated cardboard recycling and go from there. As you implement these first ideas, you and your employees will identify more ideas. Your success is only limited by your willingness to try something different - and the payoff could be immense.

An automobile assembly plant targeted the elimination of its glycol ether through product substitution, process change and optimization. The result was approximately $500,000 in savings related to material cost, lower emissions to air and water and reduced employee exposure.

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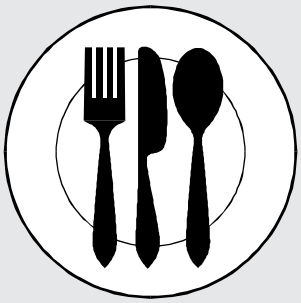
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

RECYCLED PAPER

GENERAL WASTE REDUCTION TIPS

- ✖ Establish a company-wide commitment to preventing pollution as a part of doing business.
- ✖ Establish a pollution prevention hierarchy for your company. Typically, source reduction is the highest priority, followed by reuse and recycling.
- ✖ Establish a task force headed by an enthusiastic pollution prevention advocate.
- ✖ Develop goals with measurable objectives.
- ✖ Develop a budget, making sure that needed resources will be available.
- ✖ Design a management strategy to reduce waste, prioritize waste reduction options and then develop an implementation schedule.
- ✖ Identify and prioritize problem wastes; evaluate reduction potentials.
- ✖ Identify when and where waste is generated.
- ✖ Identify waste characteristics, including quantities of each material and how it is handled and disposed.
- ✖ Develop employee education programs on pollution prevention.
- ✖ Train employees in pollution prevention techniques.
- ✖ Develop an informal materials exchange with other companies.
- ✖ Use formal material exchange services.
- ✖ Rent or share equipment that is used only occasionally.

CAFETERIAS AND RESTAURANTS

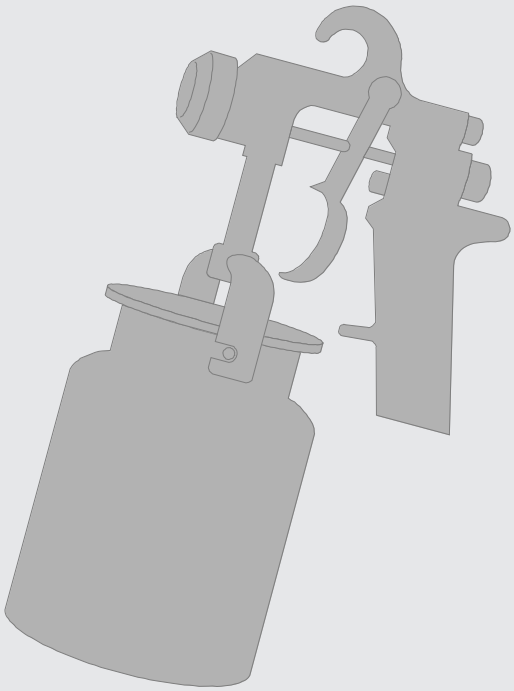


- ❒ Replace disposable items (cups, utensils, trays, dishes and single serving condiment containers) with reusable items.
- ❒ Buy in bulk to reduce container waste, but avoid buying too much of a product that might spoil.
- ❒ Donate extra food to feed the hungry and homeless. Check before you donate because these programs have guidelines for these donations.
- ❒ Encourage employees to bring their own containers or mugs to the company cafeteria. Make sure this complies with the health code governing cafeteria operations.
- ❒ Ask suppliers to provide products packaged in recyclable materials such as paper, glass, tin or aluminum.
- ❒ Evaluate waste for recycling or composting potential.
- ❒ Recycle corrugated cardboard, glass, metals, plastic and polystyrene.
- ❒ Compost kitchen scraps.
- ❒ Send grease to a renderer.

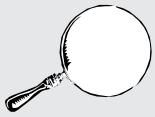
CLEANING AND DEGREASING OPERATIONS

- ❒ Use poly-pigs or other cleaning devices rather than chemicals to clean transfer lines.
- ❒ Use dry and nonsolvent cleaning procedures when feasible.
- ❒ Schedule production of the lightest color batch first so that cleaning rinses can be used for subsequent batches.
- ❒ Use countercurrent cleaning methods where possible (i.e., used solvent for initial cleaning and clean solvent for final cleaning).
- ❒ Dedicate process equipment to a single product, where feasible, to reduce the number of cleanups.
- ❒ Recover spent solvent for reuse and recycling.
- ❒ Cover cleaning tanks with an impervious material to prevent vapor loss.
- ❒ Centralize and consolidate cold cleaning operations to minimize vapor losses.
- ❒ Avoid cross-contamination of cleaners.
- ❒ Extend life of cleaners through filtration and replenishment.
- ❒ Increase drain times for parts before and after washing to reduce dragout.
- ❒ Remove sludge from cleaning tanks on a regular basis.
- ❒ Designate responsibility for coolant maintenance and replacement.
- ❒ Use coolants that have a long life.

COATING AND PAINTING OPERATIONS

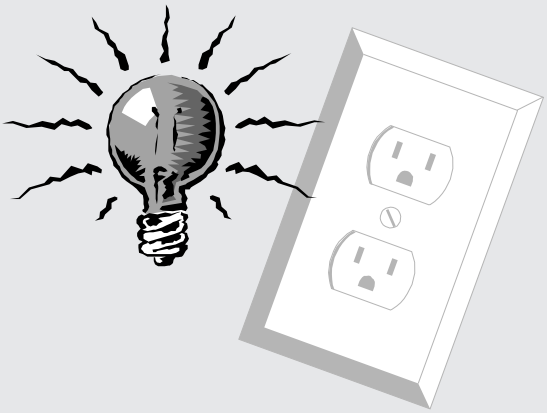


- ❒ Arrange for training of paint operators to minimize unacceptable quality and paint waste.
- ❒ Size paint batches systematically to specific jobs.
- ❒ Use equipment with high transfer efficiency (such as electrostatic applicators).
- ❒ Automate spray and dip operations where possible.
- ❒ Design filters properly to prolong filter life and minimize waste.
- ❒ Recycle overspray.
- ❒ Evaluate the use of different types of paint arrestors such as water curtains and filters to determine least waste generation.
- ❒ Optimize spray speed, instance, angle, pressure and other conditions to reduce overspray.
- ❒ Regularly inspect production equipment - such as racks - for cleanliness.



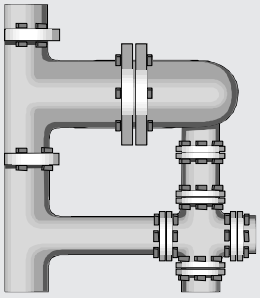
- ❒ Use water-based or high-solids coatings whenever possible.
- ❒ Routinely clean hooks to prevent paint buildup, that can interfere with painting operations.

ENERGY CONSERVATION



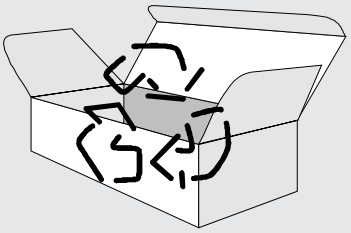
- ❒ Replace lighting with energy efficient bulbs.
- ❒ Set up an energy audit for your facility and institute recommendations for energy efficiency.
- ❒ Turn off equipment when you finish using it. In most cases, this saves energy - but check manufacturer instructions to be sure.
- ❒ Manage information electronically. Not only will this reduce waste paper, but will reduce printer use, an energy intensive process.
- ❒ Stop copying. Along with printers, copiers are energy intensive.
- ❒ When replacing equipment, check for energy saving features and train employees in energy-wise practices.

LEAK AND SPILL PREVENTION



- ❒ Capture and reclaim spilled or leaked materials.
- ❒ Routinely inspect and maintain valves, pipes, joints, pumps, tanks, etc. to prevent waste generation due to leaks and spills.
- ❒ Use seal-less pumps.
- ❒ Use oil-absorbent pads and reclaim both the pads and used oil instead of using granulated absorbents.
- ❒ Install spill basins or dikes in storage or material use areas.
- ❒ Install splash guards and drip boards on tanks and faucets.
- ❒ Install overflow control devices on process and storage tanks.
- ❒ Maximize use of welded pipe joints to prevent potential leak points.

MAINTENANCE AND STORAGE AREAS



- ❒ Use reusable containers that are collapsible, nestable or stackable for efficient storage and shipping.
- ❒ Segregate recyclable materials.
- ❒ Recycle cardboard, plastic, paper, glass, motor oil, metals and other materials.
- ❒ Identify storage needs for recyclables.
- ❒ Use compactors or balers to reduce the volume of recyclable materials. This conserves storage space, reduces transportation costs and increases marketability.

MATERIAL HANDLING

- ❒ Do not mix unlike materials except as required for production.
- ❒ Return empty containers to suppliers.
- ❒ Stack containers in accordance with manufacturers' recommendations to prevent collapsing from excessive weight or improper weight distribution.

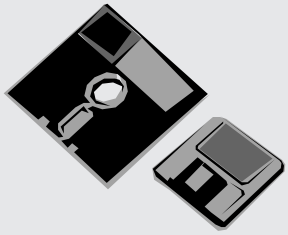
- ❒ Receive materials in reusable and/or recyclable containers.
- ❒ Label all containers and process tanks properly to minimize contamination, especially for hazardous materials.
- ❒ Regularly look for ways to reduce or eliminate losses due to spoiled batches, out-of-date stock, spills and unused formulations.

OFFICE AREAS

- ❒ Ask suppliers to reduce unnecessary packaging or packing materials.
- ❒ Use both sides of paper when copying documents.

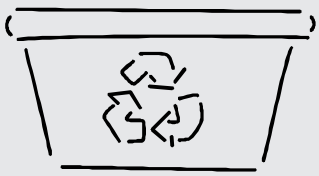
- ❒ Use the back side of drafts for scrap paper.
- ❒ Use routing slips for reports, memos, magazines and other printed items to reduce the number of copies generated.
- ❒ Use electronic or physical bulletin boards for memos and announcements.
- ❒ Purchase only the quantity of supplies needed (especially letterhead, envelopes and business cards) to reduce the amount of outdated stock being thrown away.
- ❒ Investigate less toxic alternatives to common solvents used in the office, i.e., thinners, masking liquids, copy fluids, etc.

- ❒ Purchase reusable mugs for employees to eliminate disposable drinking cups.
- ❒ Maintain copiers, computers and other equipment to minimize scrap paper generation and to prolong the life of these machines. Negotiate service contracts.
- ❒ Give unneeded shipping boxes to employees to take home.
- ❒ Keep your mailing lists current to cut down on undeliverable and duplicate mailings that will be thrown away.
- ❒ Request removal of your company from unwanted mailing lists and when duplicate mailings are received.



- ❒ Store documents on disk to reduce paper and file space.
- ❒ Perform a "waste basket audit" to evaluate office recycling potential (usually necessary for office paper, newspaper, glass, corrugated cardboard and polystyrene dishware).

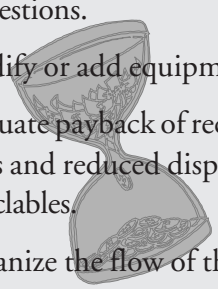
- ❒ Estimate office waste volume and composition. Call possible markets and speak with your waste handling contractor for recycling possibilities.
- ❒ Boost employee participation in office recycling programs with incentives and education.
- ❒ Provide "recycling baskets" instead of waste baskets for recyclable paper.



- ❒ Locate paper recycling containers near copiers, printers and other large paper generation points.
- ❒ Identify central storage capacities and container needs.
- ❒ Buy recycled office supplies when available.
- ❒ Return laser printer and copier toner cartridges to suppliers for recycling.

PRODUCTION LINES

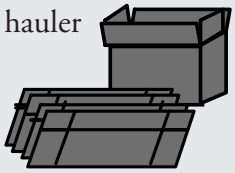
- ❒ Substitute nonhazardous ingredients for hazardous material and biodegradable materials for persistent materials where possible.
- ❒ Mix only the volume of material required to fill an order.
- ❒ Recover oils, solvents and other cleaning materials for reuse and recycling.
- ❒ Perform regular maintenance to prevent leaks and prolong equipment life.
- ❒ Evaluate process performance to help determine efficiency; adjust as necessary to be certain waste and off-specification products are kept to a minimum.
- ❒ Purchase efficient equipment, train and motivate employees and install quality monitoring systems to reduce production line rejects.
- ❒ Separate recyclable materials from waste and implement a collection system for recoverable materials.
- ❒ Educate employees about source separation; encourage employee suggestions.



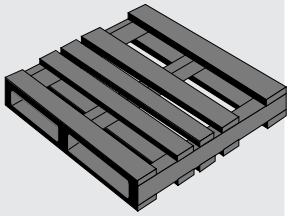
- ❒ Modify or add equipment to reuse or recycle scrap on site.
- ❒ Evaluate payback of recycling programs by considering reduced input costs and reduced disposal costs, and any profits made from the sale of recyclables.
- ❒ Organize the flow of the production line to minimize material handling.

SHIPPING AND RECEIVING AREAS

- ❒ Reduce the generation of corrugated cardboard waste by working with suppliers to provide returnable and reusable containers.
- ❒ Distribute your products in returnable containers to reduce consumption of raw materials.
- ❒ Keep recoverable items such as corrugated cardboard containers separate from waste.



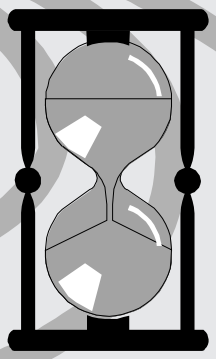
- ❒ Recycle corrugated cardboard and plastic; find a broker or consult your waste hauler for potential collection service.
- ❒ Compact or bale large quantities of cardboard or plastic.
- ❒ Share compactors and balers with neighboring businesses if you have small quantities of recyclables.



- ❒ Buy some items in bulk if it will reduce waste.
- ❒ Designate storage space for recyclables.
- ❒ Reuse and recycle pallets.
- ❒ Ask suppliers to provide packing materials that are returnable, reusable or recyclable.

WATER USE AND CONSERVATION

- ❒ Use high-pressure washing equipment to reduce the amount of waste water generated.
- ❒ Use a centrifuge or cyclone to remove paint solids from water arrestor holding tanks to reduce the need for water replacement.
- ❒ Measure water inflow and outflow rates from each unit process to assess water use.
- ❒ Reuse clean or contaminated water where possible.
- ❒ Segregate plating waste streams to allow metal recovery and to reduce treatment, chemical purchase costs and sludge handling costs.
- ❒ Use countercurrent rinsing techniques.
- ❒ Install drainboards and dragout tanks to recover dragout losses.
- ❒ Hold racks over plating tanks for a sufficient amount of time to minimize dragout.
- ❒ Use air knives or fog nozzles to reduce the volume of dragout losses.
- ❒ Equip rinse tanks with flow control valves.
- ❒ Agitate rinse baths (bubbling air or mechanical stirring) to reduce water consumption.
- ❒ Use timers and foot pedals to control water use.
- ❒ Use conductivity controllers on plating rinse tanks to control water use.
- ❒ Use metal recovery technologies (i.e., ion exchange, reverse osmosis, electrolysis) or evaporators to facilitate recycling and reuse of rinse waters.
- ❒ Use a centrifuge or filter press to dewater sludge and reduce disposal costs.



GLOSSARY OF POLLUTION PREVENTION/WASTE REDUCTION TERMS

Backhauling:	**W**orking with a supplier or other hauler to take back packaging, containers or other material after delivery. This eliminates empty loads.
Baling:	**C**ompressing and wrapping a material with wire, twine or string to form a unit that is easier to handle, store and transport.
Biodegradable Material:	**A** material that is broken down by bacteria into less complex, sometimes less hazardous chemical compounds or basic elements.
Brokers:	**A**gents or intermediary buyers who acquire scrap materials and bulk products from processors and recyclers and arrange delivery to the end users.
Collection Center:	**A** facility designed to accept reusable, recyclable or compostable materials from public or private sources.
Collector:	**C**ompanies that pick up or accept delivered materials from various local sources and sell accumulated quantities to brokers, processors and scrap materials consumers.
Compost:	**R**elatively stable, decomposed organic material.
Composting:	**T**he controlled microbial degradation of organic waste to yield a humus-like product.
Computer Printout (CPO):	**A** paper grade: computer paper, white or white with green bars.
Contaminant:	**A**ny material that has a deleterious effect on a product or the usability of a recyclable material. Too many contaminants may render materials useless for recovery.
Cullet:	**C**lean, color-sorted, crushed glass. Cullet is added to raw materials during glass-making since it can increase the rate of heat gain, thus reducing melting time and fuel costs.
Disposable Product:	**A**ny product with an essential part that cannot be recycled, refilled or renewed.
Diversion Credits:	**F**ees paid by a municipal or other government to a recycler as compensation for avoiding costs of waste collection and disposal.
Dunnage:	**B**attens used to protect cargo and products during shipping.
File Stock:	**A** grade of paper waste, essentially consisting of mixed office papers. This grade is frequently recycled into tissue products.
Generator:	**T**he producer of any type of waste or recoverable material.
Grade:	**A** classification of recyclable material based on its use, appearance, quality, manufacturing history, raw material or performance.
Hauler:	**A** waste collection company that offers complete refuse removal services. Many haulers now offer to serve as collectors of recyclables.

GLOSSARY (continued)

High-Grade Paper:	**R**elatively valuable types of office papers, such as computer paper, laser printout, white ledger and tab cards. White ledger includes most copy paper and letterhead.
Landfill:	**A**n area of land in which deposits of waste are buried. Licensed landfills under Part 111 or Part 115 of Michigan Public Act 451 of 1994 may be one of the following types: Type I: Designed for hazardous waste. Type II: Designed for municipal solid waste. Type III: Designed for construction and demolition debris and low hazard industrial waste.
Materials Recovery Facility (MRF):	**A** plant that processes or prepares recoverable materials for shipment to end-users. Incoming material can be commingled or source separated as recyclable, reusable and compostable materials. At some MRFs, materials are extracted from mixed waste (dirty MRF).
Mixed Paper:	**S**crap paper of various grades, weights and colors. To be recyclable, limits must usually be placed on the inclusion of some types of paper.
Old Corrugated Containers (OCC):	**A** grade of paper, generally consisting of corrugated cardboard having a ruffled inner liner between two layers of kraft paper. Does not include liner-board or paperboard such as cereal boxes or clothing liners.
Old Newspaper (ONP):	**A** grade of newsprint, suitable for recycling into boxboard, paperboard and many construction and packing materials.
Paper Stock:	**S**crap or waste papers that have been sorted and baled into specific grades.
Photodegradable:	**A** material that undergoes destruction of its chemical structure when exposed to light. Typically, the materials become brittle with time and fragment into small pieces or powder.
Pollution Prevention:	**E**liminating or minimizing the initial generation of waste at the source, or utilizing environmentally sound on-site and off-site reuse or recycling. It applies to all waste or emissions released to the air, water and land and avoids cross media transfer of waste. Waste treatment, release or disposal is not considered pollution prevention.
Post-Consumer Waste	**P**roducts and packaging that have been discarded by household or business users; (printers' trimmings are not considered post-consumer by most standards).
Post-Industrial Waste:	**W**aste created in the manufacture of a product.
Processors:	**C**ompanies that convert secondary materials into a form more suitable for transportation or manufacture into new products.

GLOSSARY (continued)

Reclaimed Oil:	**U**sed oil that has been cleaned of insoluble contaminants for use as an industrial grade lubricant or fuel.
Recoverable Materials:	**M**aterials that can be separated from waste for reuse, recycling or composting. These may include production scrap, corrugated cardboard containers, office papers, pallets and many other materials.
Recovery:	**P**rocesses for recovering usable materials from wastes. Usable portions are isolated from unusable materials by mechanical or manual separation and chemical or thermal separation processes.
Recovery Rate:	**T**he quantity of a waste recovered as a percentage of the total waste.
Recycling:	**T**he collection, separation and recovery of useful materials that would otherwise be discarded as waste, for manufacture into raw materials or new products.
Re-refined Oil:	**W**aste oil that has been cleaned of insoluble and soluble contaminants to its original base oil condition before formulation with additives. Re-refined oil is also called lubricating base oil and suitable for fine grade lubrication.
Resource Recovery:	**T**he extraction of discarded materials for use in the manufacture of new products or as a fuel or energy source. An "umbrella" term for recycling, composting, waste-to-energy and other alternatives to landfilling.
Retreading:	**A** process whereby a worn tread is removed and a new tread is placed on an undamaged tire casing.
Reuse:	**U**se of a product at least twice without changing its original form.
Scrap:	**D**iscarded materials that can be economically recycled.
Scrap Consumers:	**A** company or "end-user" that receives scrap and processes it into usable products.
Scrap Tire:	**A** tire considered unroadworthy by virtue of worn tread or damaged carcass.
Secondary Production:	**T**he production of materials or products substantially from scrap.
Shredding:	**S**ize reduction by shearing, tearing or chopping action.
Solid Waste:	**I**ncludes residential, commercial and industrial wastes. Does not include liquid or semiliquid hazardous wastes which are regulated under the Resource Conservation and Recovery Act (RCRA).
Source Separation:	**T**he segregation of materials from a waste stream at the point of generation.
Source Reduction:	**T**he philosophy or practice of not creating or generating waste materials by increasing efficiency, substituting materials or changing processes so that fewer waste materials are produced.

GLOSSARY (continued)

Used Oil:	**O**il that has been used and may or may not be suitable for recycling or re-refining.
Volume Reduction:	**C**ompaction or densification of waste or recoverable materials by baling, shredding and/or compaction.
Waste:	**S**urplus, obsolete, off-specification, contaminated or otherwise unneeded or unwanted material earmarked for disposal.
Waste Assessment or Audit:	**A** study to determine the source, composition, quantities and destinations of materials in a waste stream.
Waste Exchange:	**A** system for matching one company's "waste" with the raw material needs of another company.
Waste Management:	**A**dministration of the reduction, collection, separation, storage, transportation, transfer, processing, treatment and disposal of wastes.
Waste Reduction:	**T**he combined efforts of source reduction, reuse, recycling and composting practices.
Waste Paper Grade:	**C**lassifications of waste paper.
Waste Stream:	**W**aste from the point of generation to a final destination.
Waste-to-Energy Conversion (WTE):	**T**he incineration of wastes as a fuel to release energy rather than burying potential fuel in a landfill.
White Goods:	**D**iscarded refrigerators, stoves, washers, dryers and other appliances.
White Ledger:	**W**hite sulfite or sulfate ledger paper; includes copier paper, letterhead and white notebook paper.

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