



# Fact Sheet

OFFICE OF WASTE REDUCTION SERVICES

State of Michigan • Departments of Commerce and Natural Resources

## WASTE REDUCTION CHECKLIST ✓

While opportunities for reducing waste are limitless, a few tried and true methods are presented here. Pick from the categories in this checklist that are most applicable to you and don't feel as if you have to do everything at once. Start with one or two key areas of opportunity, such as cardboard recycling or solvent recovery, and move on from there. You and your employees will probably have some creative ideas to add. Your waste reduction success is limited only by your imagination!

Tips for this checklist have been divided into the following categories:

- *General Reduction Tips*
- *Material Handling*
- *In the Office*
- *In the Shipping/Receiving Area*
- *In the Maintenance/Storage Area*
- *In the Cafeteria and Restaurant*
- *Leaks and Spills*
- *Cleaning and Degreasing Operations*
- *Coating and Painting*
- *Water Use and Conservation*

### ✓ *General Reduction Tips*

- Establish a waste reduction hierarchy for your firm. Typically, source reduction is the highest priority, followed by reuse. Recycling and composting are next best.
- Establish a waste reduction task force, headed by an enthusiastic "reduction advocate".
- Develop waste reduction goals with measurable objectives.
- Establish a company-wide commitment to making waste reduction a part of doing business.
- Develop a waste reduction budget. Be sure that needed resources will be available.
- Design a management strategy to reduce waste, prioritize options and develop an implementation schedule.
- Identify problem wastes; evaluate reduction potential.
- Identify when and where waste is generated.
- Identify waste characteristics, including quantities of each material, and how waste is handled and disposed.
- Develop employee education programs on reducing waste generation.
- Train employees in waste reduction techniques.
- Develop an informal waste exchange with other companies.
- Use formal waste exchange services.



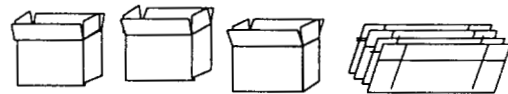
## ✓ *Material Handling*

- Do not mix unlike materials, except as required for production.
- Return empty containers to suppliers.
- Stack containers in accordance with manufacturers' instructions 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.

## ✓ *In the Office...*

- Perform a "waste basket audit" to evaluate office recycling potential (usually necessary for office paper, newspaper, glass, cardboard).
- Estimate office paper volume and composition (i.e. mixed color, high-grade white paper, file stock or computer paper).
- Recycle office paper, newspaper, glass, cardboard and other materials.
- Boost employee participation in office paper 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 generators.
- Identify central storage capacities and container needs.
- Ask suppliers to reduce unnecessary packaging or packing materials.

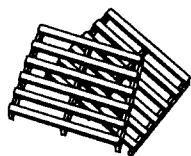
- Use both sides of all paper when copying documents.
- Use the back side of drafts for scrap paper.
- Use routing slips for reports, memos, magazines and other printed items to reduce the number of copies.
- Use electronic or physical bulletin boards for memos and announcements.
- Purchase only the quantity of supplies needed, especially letterhead, envelopes and business cards to reduce the need to throw away outdated stock.
- Return laser printer and copier toner cartridges to suppliers.
- Purchase reusable mugs to eliminate disposable drinking cups
- Maintain copiers, computers and other equipment to minimize scrap generation and to prolong the life of these machines; negotiate service contracts.
- Give unneeded shipping boxes to employees to take home.



## ✓ *In the Shipping/Receiving Area...*

- 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 your consumption of raw materials.
- Keep recoverable items such as corrugated cardboard containers separate from waste.

- Recycle cardboard and plastic; find a broker or consult your waste hauler for potential collection service.
- Compact or bale cardboard or plastic if your quantities are large.
- Share compactors and balers with neighboring businesses if your recyclable quantities are small.
- Buy some items in bulk where this reduces waste.
- Designate storage space for recyclables.
- Reuse and recycle pallets.
- Ask suppliers to provide packing materials that are recyclable, reusable or returnable.



### ✓ *On the Production Line...*

- Substitute non-hazardous ingredients for hazardous materials where possible.
- Mix only the volume of material required to fill an order.
- Recover oils, solvents and other cleaning materials.
- 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 more efficient equipment, train and motivate employees, and install quality monitoring systems to reduce production line rejects.
- Separate recyclable materials from waste.

- Implement a collection system for recoverable materials.
- Educate employees about source separation; encourage employee suggestions.
- Modify production equipment to reduce production scrap.
- Recycle production scrap.
- Modify or add equipment to recycle scrap on-site.
- Evaluate pay-back of recycling programs in terms of reduced input costs and reduced disposal costs.
- Organize the flow of the production line to minimize handling of materials.

### ✓ *In the Maintenance/Storage Area...*

- Recycle cardboard, plastic, paper, glass, motor oil, metals and other materials.
- Segregate recyclable materials.
- Identify storage needs for recyclables.
- Use reusable containers that are collapsible, "nestable" (fit inside each other) or stackable for efficient storage and shipping.
- Use compactors or balers to reduce volume of recyclable materials. This serves to conserve storage space, reduce transportation costs and increase marketability.

### ✓ *In the Cafeteria and Restaurant...*

- Evaluate waste for recycling or composting potential.
- Recycle corrugated cardboard, glass, metals and plastic.
- 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.
- Encourage employees to bring their own containers or mugs to the company cafeteria.
- Ask suppliers to provide products packaged in recyclable materials such as paper, glass, tin or aluminum.
- Compost kitchen scraps.
- Send grease to a renderer.



## HAZARDOUS MATERIALS

The remainder of this checklist addresses the elimination or reduction of potentially toxic or hazardous materials. These general techniques range from simple, creative changes in material handling to installation of new waste recovery and recycling equipment.

### ✓ *Leaks and Spills*

- Capture and reclaim spilled or leaked materials.
- Routinely inspect and maintain valves, pipe joints, pumps, tanks, etc. to prevent waste generation due to leaks and spills.
- Use seal-less pumps.
- Use oil-absorbant pads to reclaim both the pads and used oil (instead of using granulated absorbants).
- Install spill basins or dikes in storage areas.
- Install splash guards and drip boards on tanks and faucets.

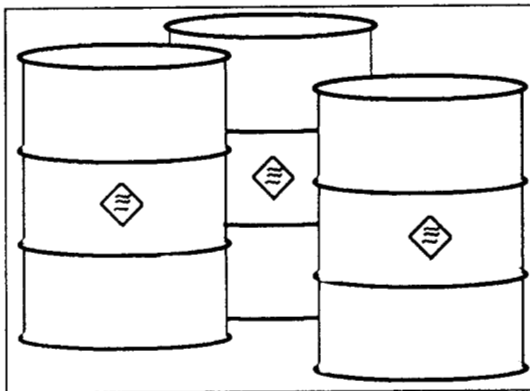
- Install overflow control devices on process and storage tanks.
- Maximize use of welded pipe joints.

### ✓ *Cleaning and Degreasing*

- Use poly-pigs or other cleaning devices rather than chemicals to clean transfer lines.
- Use dry and non-solvent cleaning procedures when feasible.
- Schedule production of the lightest color batch first so that cleaning rinses can be used for subsequent batches.
- Use counter-current cleaning methods where possible (i.e. using dirty 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.
- 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 (e.g. of powder coatings).
- Evaluate the use of different types of paint arrestors such as water curtains and filters, to determine least waste generation.
- Optimize spray speed, distance, 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 which can interfere with painting operations.



## ✓ 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.
- Install flow control valves.
- Measure water inflow and outflow rates from each unit process to control water usage.
- Reuse clean or contaminated water where possible.
- Segregate plating waste streams to allow metal recovery, 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 sufficient time to minimize dragout.
- Use air knives or fog nozzles to reduce 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 usage.
- Use conductivity controllers on plating rinse tanks to control water usage.
- 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 de-water sludge and reduce disposal costs.

*Developed by:*

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For more information on the subject of waste reduction for businesses, contact the **Office of Waste Reduction Services**, Michigan Department of Commerce, P.O. Box 30004, Lansing, MI 48909; (517) 335-1178.

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