



Appliance Recycling Requirements for Recyclers

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Improper storage and disposal of waste appliances and their components can have negative effects on human health and the environment. The wastes found in appliances can be toxic to humans, sometimes causing serious health complications for you, your employees, and your families. The ground, air, and water that we all depend on and appreciate in Minnesota can also be impacted by these wastes.

This fact sheet will help you recognize the harmful wastes associated with appliances and offer guidance on recycling or disposal of appliances and their components.

Background

Minnesota law requires all major appliances to be recycled. Hazardous materials or components within major appliances must be removed and properly recycled or disposed of before the

appliance is scrapped. The metal portions of major appliances must be recycled or reused.

When processing appliances, the wastes generated may be recyclable metals, industrial solid waste, electronic waste, hazardous waste or a subset of hazardous waste known as universal waste, all

of which are explained further in this fact sheet and in additional resources listed on

pages 3-4. Most of the wastes in appliances are recyclable; some can be sold for profit.

Permit and notification requirements

The following permits and notifications will need to be in place before you can accept any appliances for processing:

1. Recyclers who intend to accept electronics waste must submit the required notification to the MPCA. This requirement is discussed further in the electronics section of this fact sheet.
2. The MPCA and U.S. Environmental Protection Agency (EPA) require technicians to be certified in removing refrigerants from appliances and to use registered removal equipment. The EPA issues certification. This is discussed further in the refrigerant section of this fact sheet.
3. Submit a Permit-by-Rule (PBR) notification to the Minnesota Pollution Control Agency (MPCA). To get started, complete the [Solid Waste Recycling Facility Permit-by-Rule](#) forms available at www.pca.state.mn.us/waste/swpermits.html. Scroll to the bottom of the Web page for a list of MPCA staff members who can help you with forms and answer questions about requirements.
4. Notify the county in which your business is located. County ordinances may require you to apply for conditional-use permits, locate your business in a properly zoned area, and pay annual licensing fees.

Major appliances

- Clothes washers and dryers
- Dishwashers
- Hot water heaters
- Heat pumps
- Furnaces
- Garbage disposals
- Trash compactors
- Conventional and microwave ovens
- Ranges and stoves
- Air conditioners
- Dehumidifiers
- Refrigerators and freezers

Managing specific wastes

Batteries

Appliances with remote controls, circuit boards, or digital clocks, and older freezers with electric “power loss” alarms may contain batteries. Certain batteries, including lead-acid batteries, nickel-cadmium batteries, lithium batteries, and silver-containing batteries, must be removed from appliances and managed

properly as hazardous or universal waste. For more information on identification and management of batteries, see MPCA hazardous waste fact sheet #4.05, [Managing Dry-cell Batteries](#), available in the Specific Waste section of [Hazardous Waste Publications](#).

Electronics

Electronic waste, often referred to as *e-waste*, includes appliances with cathode-ray tubes (CRTs) or circuit boards. CRTs, found in televisions and computer monitors, contain substantial amounts of lead. Circuit boards commonly contain heavy metals, including lead, cadmium, and silver, at sufficient levels to make the boards a hazardous waste. As appliances become more sophisticated, they are increasingly likely to contain computer circuitry. Remove circuit boards and CRTs from appliances and recycle or manage them as hazardous waste.

For more information on proper management of e-waste, see MPCA hazardous waste fact sheet #4.15, [Managing Electronic Wastes from Business Sources](#), available in the Specific Waste section of [Hazardous Waste Publications](#).

If you intend to accept e-waste for collection or recycling, you must register your business with the MPCA and report the amount of e-waste you collect annually. For more information and forms, please visit the MPCA [Web page for e-waste recyclers](#).

Mercury-containing devices

Minnesota law requires that mercury in appliances be removed for reuse or recycling before disposal of the appliance.

The source of mercury in appliances is usually switches that turn electrical circuits on and off. Chest freezers, clothes washers, space heaters, household irons, and sump and bilge pumps are examples of appliances that often contain these types of mercury switches. On a chest freezer, the switch controls the interior light. The

switch on a washing machine stops the washing machine if the lid is opened while it is running. Older boilers and furnaces connected to hot water or steam heating systems may have a mercury switch in the aquastat.

Check gas-fired appliances, including gas stoves, gas-fired refrigerators, and gas-fired pool heaters, for mercury-containing flame sensors associated with gas pilot lights.

To access hazardous waste publications on MPCA's Web site:

- Click on **Waste** in the menu bar
 - Click on **Publications** in the drop-down menu bar
 - Click on **Hazardous Waste Publications** in the bulleted list
 - Click on the appropriate section below **On This Page**
-

You may also find mercury in gauges, batteries, and fluorescent and high-intensity discharge (HID) lamps. Check flat-panel monitors and televisions and the back panel of gas and electric stoves, washers, and dryers for fluorescent and HID lamps.

Manage mercury-containing devices, a universal waste, according to universal waste requirements. For more information on universal waste requirements, see MPCA hazardous

waste fact sheet #4.62, [Managing Universal Wastes](#), available in the Specific Waste section of [Hazardous Waste Publications](#).

PCB ballasts and capacitors

Older appliances with ballasts or small capacitors use PCB oils to transfer heat and insulate electrical equipment. Although ballasts and small capacitors contain small volumes of PCB oils, PCBs are usually present in extremely high concentrations.

Manufacture of PCB-containing equipment was prohibited in 1979. Assume that all ballasts and small capacitors contain PCBs unless they are labeled “No PCBs” or they are known to have been manufactured after 1979.

Appliances that likely contain PCB capacitors include those with motors, such as washing machines, refrigerators, dehumidifiers, furnace blowers, and window or central air conditioners. Appliances generating high voltages, such as fluorescent light ballasts and microwave ovens also probably contain PCB capacitors. Remove all ballasts and capacitors that may contain PCBs from appliances and manage them as a hazardous waste.

PCB wastes have specific storage and notification requirements. For more information on how to manage ballasts and capacitors, see MPCA fact sheet #4.48f, [Managing PCBs in Ballasts and Small Capacitors](#), available in the Specific Waste section of [Hazardous Waste Publications](#).

Refrigerants

Refrigerants are chemicals used in the compressors of appliances that keep things frozen or cold, such as air conditioners, dehumidifiers, refrigerators, freezers, and bakery cases. Common refrigerants include chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), and hydrofluorocarbon (HFC).

If you intend to accept appliances that contain refrigerants, your employees must obtain technician certification through an EPA-approved program. The type of certification needed depends on the type of appliances being recycled. The equipment used to remove refrigerants must be registered with the EPA. For further details on certification requirements for appliance recyclers see the MPCA Web page [CFCs and Appliance Recyclers](#). Please note that this certification is different from the certification required for removing refrigerants from automobiles.

Using certified technicians and registered equipment, recover refrigerants as soon as possible after receiving appliances. Collect the used refrigerants in pressurized cylinders approved by the Department of Transportation (DOT). Contact your local fire marshal for information on storing pressurized gas containers.

Recover each type of refrigerant into its own DOT-approved cylinder, making sure different types of refrigerants are not mixed. Mixing different types of refrigerants will most likely render the refrigerants non-recyclable. Reclaimers will often pay for separated refrigerants, but will charge for taking mixed refrigerants. Refrigerants recovered from appliances must be sent to an EPA-certified reclaimer before they can be sold to someone else for reuse. Find a list of EPA-certified reclaimers on the EPA Web site, www.epa.gov, by entering “certified refrigerant reclaimers” in the search box.

The MPCA requires appliance recyclers to keep accurate, up-to-date records of technician certification, equipment registration, refrigerant removal (including documentation of removal that occurred elsewhere), invoices for the sale of recovered refrigerants, and shipping receipts. See MPCA air quality fact sheet #1.34, [Record-keeping Requirements for Small Appliance Recycling](#), for further details on recordkeeping requirements.

Appliances powered by propane or LP, such as those found in RVs and at cabins, may contain an ammonia refrigerant system. Since sodium chromate has often been added to these systems as a corrosion inhibitor, the refrigerant must be managed as hazardous waste.

Used oils

Compressors of refrigeration and air conditioning appliances and transmissions of clothes washers often contain oil. Manage oil drained from appliances according to MPCA used oil requirements. Store used oil in closed, labeled containers and ensure it is properly recycled. For more information on used oil requirements, see MPCA hazardous waste fact sheet #4.30, [Managing Used Oil and Related Wastes](#), available in the Specific Waste section of [Hazardous Waste Publications](#).

Other wastes

Appliances may contain asbestos, particularly if they are pre-1980 and create heat. Examples include hair dryers, irons, electric percolators, and propane-fired or LP-fired appliances. Contact the Minnesota Department of Health Asbestos Program for more information at 651-201-4620, or visit their Web site at www.health.state.mn.us/asbestos.

If you encounter wastes not mentioned in this fact sheet and are unsure how to manage them correctly, contact your local environmental or solid waste department or the Minnesota Pollution Control Agency for disposal information.

Additional resources

All MPCA hazardous waste fact sheets are available on the [hazardous waste publications](#) page. On the MPCA Web site home page (www.pca.state.mn.us), click on **Waste** then **Publications** then **Hazardous Waste Publications**. Links to individual fact sheets and Web sites listed in this fact sheet are gathered below.

Permitting

MPCA Web page, [Solid Waste Permit Application Forms](#) and [contact information](#)

Batteries

MPCA hazardous waste fact sheet #4.05, [Managing Dry-cell Batteries](#)

Electronics

MPCA hazardous waste fact sheet #4.15, [Managing Electronic Wastes from Business Sources](#)

MPCA Web page, [Minnesota's Electronics Recycling Act](#)

Mercury-containing devices

MPCA hazardous waste fact sheet #4.62, [Managing Universal Wastes](#)

PCB ballasts and capacitors

MPCA hazardous waste fact sheet #4.48f, [Managing PCBs in Ballasts and Small Capacitors](#)

MPCA hazardous waste fact sheet #4.48c, [Storing PCBs](#)

Refrigerants

U.S. EPA Web page, [Appliance Disposal Practices in the United States](#)

MPCA Web page, [Chlorofluorocarbons \(CFCs\) and Appliance Recyclers](#)

U.S. EPA Web page, www.epa.gov

MPCA air quality fact sheet #1.34, [Record-keeping Requirements for Small Appliance Recycling](#)

Used oil

MPCA hazardous waste fact sheet #4.30, [Managing Used Oil and Related Wastes](#)

Asbestos

Minnesota Department of Health Asbestos Program, www.health.state.mn.us/asbestos or 651-201-4620

More Information

For more information, contact your metro county office or your nearest MPCA regional office.

Minnesota Pollution Control Agency

- Toll free (all offices) 1-800-657-3864
- Brainerd218-828-2492
- Detroit Lakes 218-847-1519
- Duluth 218-723-4660
- Mankato..... 507-389-5977
- Marshall..... 507-537-7146
- Rochester 507-285-7343
- St. Paul..... 651-296-6300
- Willmar..... 320-214-3786
- Web site..... www.pca.state.mn.us

Metro County Hazardous Waste Offices

- Anoka 763-422-7093
- Carver.....952-361-1800
- Dakota 952-891-7557
- Hennepin 612-348-3777
- Ramsey 651-266-1199
- Scott952-496-8475
- Washington 651-430-6655
- Web sites..... [www.co.\[county\].mn.us](http://www.co.[county].mn.us)

Table 1: Summary of common appliances, wastes, and disposal methods.

Note: this is not a complete list and should only be considered a reference for the contents of this fact sheet.

Waste	Batteries	Electronics	Mercury	PCBs	Refrigerants	Used oils
Manage waste as	Haz. or Universal	E-waste (Universal)	Universal	Hazardous	EPA-certified reclaimer	Used oil
Find waste in						
Air conditioners			if gas-fired	X	X	X
Clothes dryers			X			
Clothes washers		X	X	X		X
Computer monitors		X	X			
Dehumidifiers				X	X	
Dishwashers		X		X		
Fluorescent lamps			X			
Freezers	X		X	X	X	X
Furnaces and boilers		X	X	X		
Hot water heaters			commercial only			
Irons			X			
Microwave ovens	X	X	X	X		
Ovens (conventional)	X	X	X	X		
Ranges and stoves	X	X	X	X		
Refrigerators		X	if gas-fired	X	X	X
Televisions	X	X	X			