



Best Management Practices For Dental Office Waste

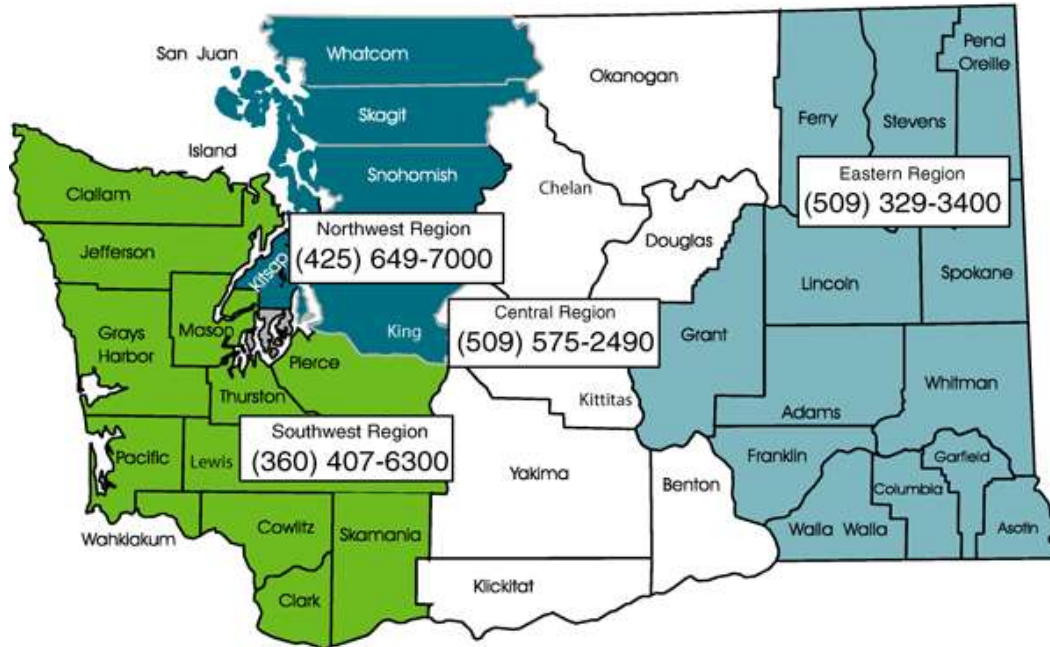


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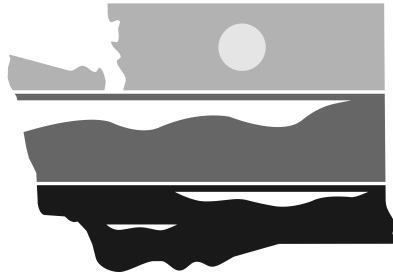


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Dental offices create a variety of wastes, which need to be managed correctly to protect our health and the environment. This guide explains the Best Management Practices (BMPs) that will help dentists follow environmental laws and prevent pollution. *Note that this guidance is only for dental offices on a sanitary sewer. Operatory waste should never go to a septic system, even with an amalgam separator.*

Mercury and Amalgam Wastes

Dental amalgam waste is a significant source of mercury received by sewage treatment plants. Sewage plants can't treat the mercury in waste, so it pollutes natural water bodies and the land the solids are applied to. Mercury is a highly toxic chemical, which poisons our nervous systems and is especially dangerous for children.



Why install an amalgam separator?

Dental wastewater often contains as much as 100-2,000 parts per million (ppm) of mercury. It is illegal to send wastewater with more than the dangerous waste limit of 0.2 ppm mercury to the sewer. Amalgam separators can remove up to 99% of dental wastewater mercury thus protecting sewage treatment plants and the water bodies they empty into.

Choosing a separator

When choosing a separator, consider factors such as:

- Cost.
- Number of operating chairs.
- Type of vacuum system.
- Waste disposal fees.
- Maintenance included or not.



For a helpful discussion on choosing a separator, see the August 2003 *Journal of the American Dental Association* article: "Purchasing, installing and operating dental amalgam separators." It's available on the American Dental Association's Web site: www.ada.org/prof/resources/pubs/jada/index.asp or Ecology's Web site: www.ecy.wa.gov/dentalbmps. For a paper copy of the article, call the Hazardous Waste and Toxics Reduction Program at the Department of Ecology, (360)407-6700.

Dealing with amalgam separator waste

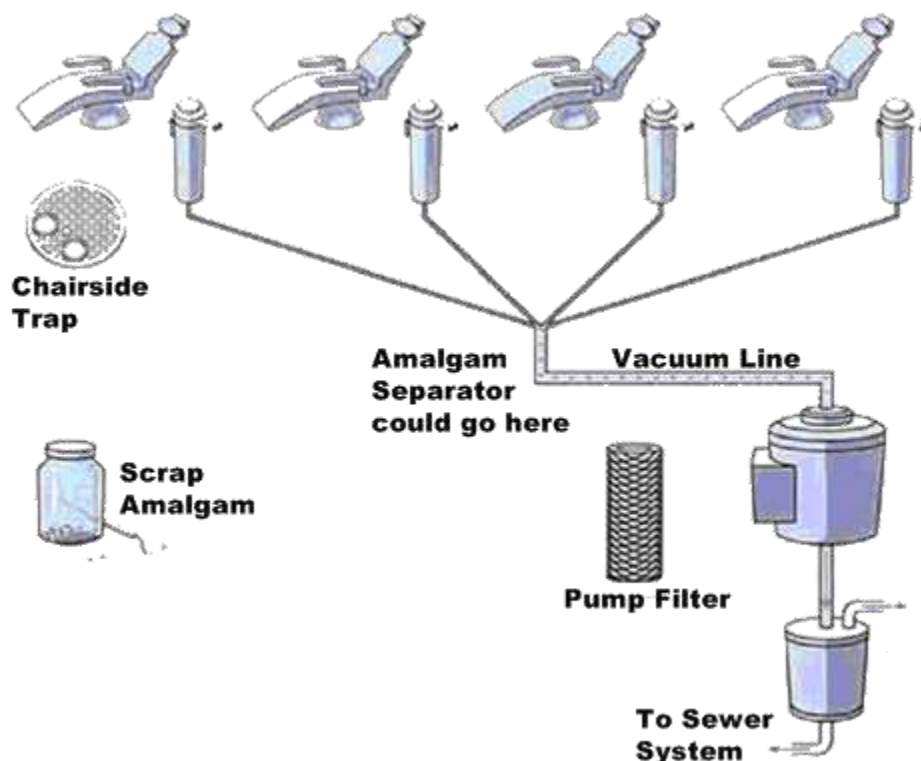
When the separator filter unit gets full, it must be disposed of as hazardous waste or recycled. There are several systems for dealing with this waste:

- Prepaid shipping kits provide shipment of the used filter and contents back to the vendor.
- Pick up and replacement service for the used filter unit as part of the maintenance contract.
- Systems requiring the dentist to manage the waste filter units themselves.

Dentists who choose to manage their own waste filter units must find a hazardous waste handler who accepts this waste for a fee. Be sure to have the separator unit serviced regularly. Keep copies of the waste disposal records and the service records for three years.

Cleaning chair-side traps

Replace or clean chair-side traps regularly according to the manufacturer's recommendations.



- Flush the vacuum system with disinfectant before changing/cleaning the trap. Allow trap contents to dry. See page 7 for safe cleaning solutions to use.

- **If the trap is disposable**, put the entire trap into a container labeled “CONTACT AMALGAM.” Close the cover tightly. Dispose of as hazardous waste (or through recycling).



- **If the trap is reusable**, remove non-amalgam contents with forceps, then tap amalgam contents into the contact amalgam container for disposal as hazardous waste (or recycling).
- Don't rinse trap contents down the drain, unless an amalgam separator is installed.

Replacing vacuum pump filters

Replace or clean pump filters on a regular basis according to the manufacturer's recommendations. Dispose of as hazardous waste (or recycle).

- **If the filters are disposable**, remove the filter cartridge from the vacuum line. Tightly screw the end cap onto the top of the filter and place filter in the original shipping box (or substitute). Dispose of the filters when the box is full.
- **If the filters are reusable**, decant free liquid into the vacuum line above the point of separator installation. Then scrape filter contents into a labeled container, using care not to spill.

Dealing with scrap amalgam

Collect and store all contact and non-contact scrap amalgam in labeled, tightly-closed containers and dispose of as hazardous waste, including waste amalgam capsules and extracted teeth.

- Follow the requirements of your waste handler for disinfection and shipping of scrap amalgam.
- Don't use heat to disinfect amalgam. Heat causes mercury to volatilize to air.
- If you store scrap amalgam in liquid, do not decant the liquid down the drain.
- Remove amalgam restorations in chunks so the chair-side trap will capture most of it.

Never dispose of scrap amalgam in the sharps container, red biohazard bag or the trash.

Questions to ask your amalgam waste handler

- What kinds of amalgam waste do you accept?
- Do you provide containers to collect amalgam wastes? If not, how do you want the amalgam waste packaged for pickup or mailing to you?
- Do you accept the whole filter screen from the chair-side trap and the vacuum pump filter cartridge for disposal?
- Is disinfection required for amalgam waste?

Clean out mercury-contaminated plumbing

As part of your new amalgam management practices, don't forget the plumbing!

- Clean or replace sink P-traps and low spots closest to the point of initial amalgam discharge.
- Mercury amalgam often settles in low spots but longer horizontal runs of plumbing also tend to accumulate waste amalgam, so check these as well.
- Treat any waste collected from this plumbing clean-out process as hazardous waste (unless tested).



X-ray Wastes

What to do with used x-ray fixer

Used fixer contains as much as 3,000 to 8,000 ppm of silver. State silver discharge limits are 5 ppm and local limits can be as low as 0.1 ppm.

- Collect used fixer in a container marked "Used fixer only." Be sure to keep developer separate from your fixer.
- Dispose of used fixer as dangerous waste and keep the disposal receipts.
- Consider switching to digital imaging and avoid generating waste fixer at all!

It is illegal to dispose of used fixer to sewer unless you are sure it meets state and local silver discharge limits. See page 5.

Some dentists use silver recovery systems to remove silver from x-ray waste. This option is not recommended due to high costs and maintenance requirements, which are usually neglected. **Important! To meet silver discharge limit, two canisters are needed.**

Why is it better to manage used fixer off-site?

Most dentists find it much cheaper and easier to simply collect used fixer for disposal or recycling. Use a local hazardous waste disposal service, which may cost as little as \$4/gallon. Dentists generally generate ½ to 1 gallon of used fixer per month. Proper off-site disposal can total as little as \$48 per year.



In comparison, silver recovery systems cost between \$200-1,700 to install and at least \$160-300 per year for necessary annual maintenance and testing. In addition, ***two silver recovery canisters in a series are required*** to meet state and local silver discharge limits, as well as following every step listed in the paragraph below.

Managing silver recovery systems (canisters)

If the cost and hassle factors described above have been reviewed and an on-site silver system is still preferred, ***the following steps are required*** in order to be in compliance with state and local regulations:

- **Set up two canisters in a series.** Two canisters are needed to ensure the outflow continuously meets state and local silver discharge limits. One canister cannot consistently ensure this is occurring.
- **Monitor the flow of used solutions into the canisters.** Keep flow rates at manufacturer's recommendations, usually between 1-3 gallons per hour, otherwise the canister will not perform properly and may deteriorate too soon, requiring replacement.
- **Have a sample valve installed between the two canisters.** This valve is necessary to take tests of the outflow from the first canister to determine when change out is needed.
- **Test your outflow periodically.** Keep a file with the test data handy.
- **Keep a maintenance/changeover log.** Work closely with your supplier for help in developing a site specific changeover schedule.
- **Check with your sewer district for local silver discharge limits.** Businesses are required to meet local silver discharge limits in addition to state limits of 5 ppm. Local silver discharge limits can be as low as 0.1 ppm.



Is used x-ray developer a problem?

Unused developer cannot go down the drain because it contains hydroquinone, which is a toxic substance. However, hydroquinone is used up in the developing process, so **used developer is non-hazardous and is safe to be disposed to sewer.**

Be sure to keep used fixer and used developer separate. Check the hoses in your x-ray machine to be sure they drain separately.

What about used x-ray film?

Used x-ray film has been tested and has been found to contain trace amounts of silver and is determined safe to dispose to regular garbage.



Lead Wastes

Lead foil

Collect lead foil from x-ray packets for recycling or disposal as a hazardous waste. Don't put lead in the sharps container, the red biohazard bag, or the trash. The practice of melting down lead foils to make fishing weights is also not recommended as lead can poison the nervous system.

Lead aprons

Worn out aprons must be disposed of as hazardous waste due to their lead content.

- Ask your supplier or the original manufacturer if they will take them for recycling or proper disposal.
- Keep them out of the landfill and the biomedical waste red bag.



Lead-lined boxes

Lead-lined boxes should not be used to store x-ray film. A nationwide Food and Drug Administration (FDA) alert warned, "in many cases there are highly dangerous levels of lead on the films." Dentists must dispose of x-ray film stored in such boxes as hazardous waste.

Sterilants, Disinfectants, and Cleaning Solutions

Disinfectants, cleaning solutions, chemiclave solutions, and cold sterilants can be hazardous depending on their ingredients and concentrations.



Some of the most common chemicals of concern are:

- Acetone
- Ammonia
- Bleaches
- Chromium
- Formaldehydes
- Glutaraldehyde
- Phenols

Before disposing of a solution containing these chemicals, determine if it is a hazardous waste. To avoid using these hazardous chemicals for sterilizing consider converting from a chemiclave to an autoclave.

Safe vacuum system cleansers

Line cleansers with bleach can dissolve mercury from amalgam particles in dental wastewater. The following line cleansers, among others, do not contain bleach or chlorine:

- Biocide
- BirexSe
- Cavicide
- Cetyl-zyme Pro-Am Concentrate
- DRNA Vac
- EZ-Syme
- E-Vac
- Fresh-Vac
- GC Spray-Cide
- Green & Clean
- Gobble Plus
- MAXI-EVAC
- Microstat 2
- Patterson Ultrasonic Cleaner
- Pro-E Vac
- Purevac
- Sani-treat Plus
- Stay-Clean
- Super Dent
- SRG Evacuation
- VAC-U-EZ
- Turbo-Vac
- Vacu-Cleanse
- Vacu-sol Ultra
- Vacuum Clean

Elemental Mercury and Mercury Spills

Elemental mercury

- Dispose of all elemental mercury with a hazardous waste management service.
- Never put elemental mercury in a sharps container, red biohazards bag, down the drain, or in the regular trash.

Mercury spills

Mercury spill kits are available from dental suppliers and safety equipment vendors. Be sure that complete spill clean up instructions are included.

At a minimum, follow these basic steps:

- Put on disposable nitrile gloves, not latex! Clean up all visible mercury immediately using a spill kit. Never suck up spilled mercury with a vacuum cleaner.
- Place all contaminated items in a sealable container. Label it and dispose as hazardous waste. Never dispose of contaminated waste in the sharps container, biohazard bag, or trash.
- Equipment is available for rent to detect mercury vapor and locate spills.



Other sources of mercury in dental offices

Non-mercury alternatives are available for this equipment. Consider replacing mercury-containing equipment with non-mercury-containing alternatives.

- Some medical equipment, i.e., thermometers, blood pressure cuffs, etc.
- Some thermostats and electrical equipment with switches.
- Fluorescent bulbs and some high-intensity lamps.