

Mercury in the environment: Coming from your business?

Mercury is a toxic, highly bioaccumulative, heavy metal element that can be dissolved or suspended in water; can occur as vapor or particles in air; or can exist as solid, liquid or vapor in soil, sediment and rock. Some forms, such as methyl mercury, are extremely hazardous to living organisms.

Mercury-containing waste water, from hospitals or other medical facilities, dentists and industries, that goes down the drain can cause fresh water stream and environmental contamination.

Mercury cannot be removed effectively from sanitary waste water that goes to local sewage treatment plants, otherwise known as the publicly owned treatment works (POTWs). At some treatment plants the mercury “passes through” the treatment plant and is discharged with the water leaving the POTW into local rivers, or it leaves the plant in the sludge which is then applied to land or incinerated.

In all of these cases the mercury is discharged to the environment. When mercury is deposited in lakes or waterways, bacteria in the water convert it to methyl mercury, a dangerous organic form that causes adverse health affects in animals and humans.

Methyl mercury contaminates the food chain and builds up in the tissue of fish and wildlife, and humans who eat the fish. Because of high mercury concentrations in fish, many states have had to issue advisories cautioning people to limit the amount of fish they eat from contaminated waters. Methyl mercury will accumulate in our tissue just as it does in fish.

Pregnant women and children are at highest risk. This is the most common human exposure to mercury and often results in fetal abnormalities. It is readily absorbed into the body through the intestines and tends to concentrate or bioaccumulate in the kidneys, blood and brain, depending on its form — organic or inorganic.

Mercury use in dental offices

Dental restorations often involve the use of amalgam, a mixture of such metals as mercury, silver, copper, zinc, tin and other powdered metals. Amalgam has been used extensively as tooth-filling material for more than 150 years, and in the past 50 years,

about 75 percent of all direct restorations have involved the use of amalgam.

Recent studies have established dental offices as a source of mercury in public sewer systems downstream of amalgam traps. Even if mercury from amalgam restoration is liberated in only

small amounts, over long periods of time a significant amount of mercury is released into the environment. In fact, it takes only one teaspoon of mercury to contaminate a 22-acre lake to the point that it must be posted for a fish advisory. For this reason, many cities and states have undertaken partnerships with local dental associations to reduce mercury from dental practices.

The Pollution Prevention Institute at Kansas State University (KSU) recommends the following methods to help dentists reduce the amount of mercury-related wastes from their offices. For more information on pollution prevention (P2) for lead or silver wastes, call the Small Business Environmental Assistance Program technical assistance line at KSU at 800-578-8898.

P2 for mercury-related dental wastes

Much mercury is lost during the restoration process when the existing amalgam is ground or broken down into smaller particles for removal from the tooth. Amalgam traps are used to recapture as much of these materials as possible but must be handled carefully when changing them to avoid inadvertent release of the collected amalgam materials. The following P2 options can help reduce that loss:

- When removing existing amalgam restorations, always use a trap or inline filter on the high volume suction and filters on the vacuum system. All amalgam traps should be sent to a recycler and should never be discarded in the garbage.
- Disposable amalgam traps are preferred to capture mercury for recovery and recycling; change weekly or more frequently if needed, or as recommended by the manufacturer.
- Never rinse reusable amalgam traps over drains when cleaning the amalgam out for recycling. Re-usable traps are not recommended because of the difficulty of removing the amalgam particles from the filter without discharging them down the drain or in the garbage. Recycle all amalgam materials removed from the traps.
- Always wear disposable gloves while changing amalgam traps!
- Recycle all mercury amalgam excess, amalgam particles captured in filter traps during restorations, and amalgam from spills or cleanup activities.



Dental mercury

The following pollution prevention practices will help reduce the amount of mercury-related waste generated from other dental amalgam-related activities:

- Never place used or excess amalgam down the drain.
- Recycle all elemental mercury and amalgam in designated containers, according to recyclers' specific instructions.
- If dental amalgam scrap has been kept under fluids such as photographic fixer, water or other liquids, do not pour the liquid down the drain — it may contain high levels of mercury. Ask your recycler for more information on how to dispose of this material properly.
- Maintain a mercury spill kit in the office and provide training for all staff on spill cleanup and acceptable handling, storage and disposal of raw (elemental) mercury and amalgam.
- Use a proper work area designed to provide secondary containment so mercury can be recovered should a spill occur. Follow written mercury spill cleanup procedures; prevent elemental mercury from being picked up by the central suction system.
- Don't put amalgam waste into an infectious (biomedical) waste container. Biomedical waste is incinerated, which would release mercury vapors into the air and onto surrounding water and soil.
- Never discard amalgam with solid waste. Solid wastes can combine with mercury in landfills to form toxic leachate, causing serious ground and surface water contamination.
- Eliminate use of elemental mercury and bulk amalgam alloy.
- Use alternative amalgams where possible; some alternatives do have limited uses due to higher costs and insurance coverage issues.
- Mix only as much amalgam as needed. Use precapsulated amalgam to avoid discharges from overmixing elemental mercury and to reduce the potential for spills and their associated cleanup wastes that can get into the environment.
- Mix small amounts of leftover or unused elemental mercury with an alloy to convert to an amalgam and add to scrap amalgam collected for recycling.
- Clean or rinse vacuum filters regularly to maintain maximum vacuum system efficiency.

The American Dental Association estimates that between 10 and 15 percent of the nation's dentists still use raw or bulk mercury rather than precapsulated amalgam. Many of the dentists who do not use elemental mercury, however, still have mercury supplies remaining in storage.

Amalgam waste requires special attention because it contains mercury and silver. Dental offices must deal with four types of amalgam waste:

- Scrap amalgam (non-contact amalgam)
- Amalgam collected in chairside traps
- Amalgam waste from central vacuum pump filters
- Amalgam sludge from office waste water treatment units

Since amalgam waste typically is designated a hazardous waste, it is best to send it to a facility that reclaims mercury and silver, or use a hazardous waste broker that will do so. Don't put amalgam waste into an infectious (biomedical) waste container. Biomedical waste is often heat-treated or incinerated, and heating amalgam releases mercury into the air, and onto soil and water.

The organizations listed below accept mercury waste dental amalgam for recycling.

Amalgaway, Indiana 800-267-1467 All amalgam wastes	Central Recycling Co. P.O. Box 9844 Kansas City, MO 800-359-9720
Dental Exchange, New Jersey 201-489-3083 Noncontact amalgam	Superior Special Services (formerly Recylights) 4747 Mustang Circle Moundview, MN 800-831-2852
Dental Recycling of North America, New Jersey 800-360-1001 All amalgam wastes	Mercury Refining Co. Inc. 1218 Central Ave. Albany, NY 12205 800-833-3505
Dental Refiners, Nevada 800-786-1742 Non-contact amalgam	Stericycle 28161 North Keith Dr. Lake Forest, IL 60045 800-355-8773
Lab Safety Supply, Wisconsin 800-356-2501 Mercury disposal program	

Dentists may also access dental waste amalgam recyclers at the Recyclers World site on the World Wide Web for mercury amalgam scrap at: <http://www.recycle.net/spec/gr065020.html>

Dentists are urged to make sure the recycler they choose has a process for recovering mercury, not only the precious metals from the amalgam, to assure that it is not released into the environment.

For assistance with mercury shipping, the above recyclers can provide specific details about packaging and sterilization requirements.



The Small Business Environmental Assistance Program's (SBEAP) mission is to help Kansas small businesses comply with environmental regulations. SBEAP operates through a consortium of the University of Kansas, Kansas State University and Wichita State University. SBEAP is funded through a contract with the Kansas Department of Health and Environment. SBEAP services are free and confidential. This fact sheet was published by Kansas State University's Pollution Prevention Institute. For more information, call 800-578-8898 or send e-mail to SBEAP@ksu.edu. Our Web address is <http://sbeap.niar.twsu.edu>. The University of Kansas, Kansas State University and Wichita State University are EEO/AA providers.