DENTAL WASTES
BEST MANAGEMENT PRACTICES GUIDE
FOR THE DENTAL COMMUNITY
PREFACE

Educators and professional organizations in Ontario’s dental community are committed to the preservation of the environment through better management of dental wastes. In collaboration with Environment Canada and the Ontario Ministry of the Environment, they are working to simplify dental waste management. This will ensure that the dental community has reliable resources on best management practices for dental wastes that are clinically effective and environmentally sound.

The regulatory framework that governs the management of dental wastes is based on both the precautionary principle and health and safety principles. The precautionary principle states that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental and health impacts. The dental community continues its commitment to sustainable development by exploring options to reduce and recycle dental waste and ultimately to minimize its ecological footprint.

It is important to understand legislated, regulatory and local bylaw requirements for dental wastes. This guide describes best practices for the management of heavy metals, biomedical/pathological and chemical wastes generated by the dental community. Each member of the community can make a difference by ensuring that the management of dental wastes is achieved with minimal impact to the environment.
ACKNOWLEDGEMENTS

This best management practice (BMP) guide was produced by the collaborative efforts of:

- City of Toronto
- College of Dental Hygienists of Ontario
- Durham College - Dental Hygiene Program
- Environment Canada – Ontario Region
- George Brown Toronto City College – Centre for Health Sciences
- Ontario Dental Association
- Ontario Dental Hygienists’ Association
- Ontario Dental Nurses & Assistants Association
- Ontario Ministry of the Environment
- University of Toronto - Faculty of Dentistry
- University of Western Ontario - School of Dentistry

In 2001, these organizations formed a working group (Dental Waste Management Working Group) to create a guide that is useful to the practicing dental community and to those in formal training. Much of the information contained in this BMP Guide is based on the Ontario Dental Association’s manual, Best Practice for Managing Dental Wastes. The BMP guide also incorporates information provided by the Canadian Standards Association, the Canadian Council of Ministers of the Environment and the Canadian Dental Association.

We wish to express our thanks and gratitude to everyone who contributed to this guide.

Please note that the information contained herein reflects the regulatory requirements in Ontario as of April, 2005. Guidelines and regulations may be subject to change at anytime. You should also contact the appropriate regulatory authorities for any updates of regulations, bylaws and guidelines. Please refer to www.ec.gc.ca/mercury/ for the most recent copy of this BMP guide.
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1.0 INTRODUCTION

Dental practices generate a number of wastes (including hazardous wastes) that can be detrimental to the environment if not properly managed. The purpose of this Best Management Practices (BMP) guide is to inform members of the dental community how to properly manage hazardous wastes in order to minimize the release of toxic substances into the environment.

We encourage all members of the dental community to become familiar with this BMP guide, as it outlines facts about waste management and the responsibility of the dental community to ensure proper handling of wastes generated in a dental practice. Every member of the dental community can make a difference.

The appropriate disposal of hazardous waste is a requirement under both Ontario’s waste management regulation and guidelines and municipal sewer use bylaws. On-site sewage treatment or septic systems used in rural dental practices are also subject to provincial regulations and municipal bylaws. In addition, pollution prevention can be used as a proactive means of protecting the environment.

It is the responsibility of the dental practitioner to determine categories of waste (e.g. hazardous, biomedical/pathological, non-hazardous etc.). Following are the dental wastes that may be classified as hazardous under current regulations, bylaws and guidelines:

- Mercury Containing Wastes
  - (a) Elemental Mercury
  - (b) Scrap Amalgam

- Silver Containing Wastes
  - (a) Spent X-Ray Fixer and Developer
  - (b) X-Ray Film

- Lead Containing Wastes
  - (a) Lead Foil Packets
  - (b) Lead Aprons

- Biomedical/Pathological Wastes
  - (a) Non-Anatomical Biomedical Wastes
    - Blood-Soaked Materials
    - Sharps
  - (b) Anatomical Biomedical Wastes

- Chemicals, Disinfectants and Sterilizing Agents

For each category of dental waste, this guide provides several disposal options:

(i) Best Management Practice (BMP)

This is the best available disposal option. It will prevent or minimize the release of polluting substances to the environment. Pollution prevention is the preferred choice where possible.

(ii) Other Options

These are alternative but less desirable disposal options. When the BMP cannot be followed, choose options that reduce the release of polluting substances to the environment from dental practices.

(iii) Caution

These are harmful disposal options. Do not dispose, within the dental practice, those substances that may release polluting substances into the environment and ensure that all wastes are placed in appropriate waste streams. Improper disposal of hazardous wastes may not only contaminate the environment, but may also be a violation of environmental legislation, regulations, bylaws and/or guidelines.

In order to comply with existing regulations and to minimize the release of specific toxic substances to the environment, members of the dental community are encouraged to follow the Best Management Practices when disposing of dental wastes. Due to the wide variety of materials used in modern dentistry and variations found among municipal bylaws, dental practitioners should consult their local municipalities for additional requirements.

In addition to environmental considerations, occupational health and safety in the dental practice is also an important consideration. In 1987 the Centers for Disease Control introduced the Universal Precautions to minimize the transmission of blood-borne pathogens to health care workers. In 1996, Universal Precautions changed to Standard Precautions to include blood and any other bodily fluids including excretions and secretions (except sweat) regardless of whether or not these contained blood. This expansion was particularly necessary due to the increased risk posed by the human immunodeficiency virus (HIV) and the unwillingness of some patients to disclose their infectious status. While the term Universal Precautions is more recognizable, this guide will reference the Standard Precautions to be consistent with international developments in dental healthcare infection control.
2.0 POLLUTION PREVENTION FOR THE DENTAL COMMUNITY

2.1 Pollution Prevention Principles

Pollution prevention is a voluntary initiative that seeks to eliminate the causes of pollution by reducing and controlling the use of toxic substances. Incorporating pollution prevention activities into dental practices will reduce the amount of hazardous wastes requiring disposal. Contact local municipalities, property managers, and suppliers about recycling and take-back programs and less harmful alternatives that help to reduce pollution. Where feasible within the dental practice, less toxic substances should replace hazardous ones. For example:

- Purchase pre-capsulated amalgam to avoid using liquid (elemental) mercury and stock a variety of amalgam capsule sizes in order to select the right amount of material for a particular restoration.
- Stay abreast of advances in restorative materials and provide patients with complete information about the benefits and risks associated with the restorative materials available.
- Purchase only the quantities of chemicals, disinfectants and sterilants that are needed in order to avoid disposal of excess.
- Clean X-ray film processor/developing equipment with soap and water only.
- Do not purchase ignitable/flammable chemicals (those with a flashpoint below 61 degrees Celsius). Refer to Material Safety Data Sheets.
- Consider the use of digital radiography.

2.2 Mobile Dental Practice

The use of portable dental equipment and mobile dental units present some specific challenges related to the disposal of dental wastes. Portable dental equipment, mobile dental units and materials are transported to the patient for the purpose of delivering dental health care and therefore do not constitute a fixed facility. However, the same BMP principles apply to any setting in which dental treatment is being provided. The added challenge is the transportation of the waste from remote locations where portable dental equipment is used.

Transportation of mobile dental wastes falls within an Ontario operational policy and is therefore exempt from certain regulatory requirements under Ontario Regulation 347. The operational policy is administratively in effect by the Ontario Ministry of the Environment and applies to this operation provided that the mobile dental practice conforms to the following requirements:

i. The waste collected is generated at the mobile dental practice by the practitioner who provided the health care;
ii. The waste is collected only by the practitioner on dental business using his/her own vehicle;
iii. The waste collected must be transported to the local waste transfer facility. In this application the local waste transfer facility is the practitioner’s office or a facility operating under a Certificate of Approval which authorizes the acceptance of the waste;
iv. The waste is packaged in appropriately labelled containers;
v. A written record is kept at the “local waste transfer facility” to record each time that an item of waste is received or stored at the facility. The record specifies the nature and quantity of the waste and is retained on site for at least two years;
v. The waste must be transported from the local waste transfer facility by an approved waste management company to a disposal/recycling site approved to accept this type of waste.

A Certificate of Approval (system) or a manifest is not required for the practitioner to transport the waste from the mobile dental practice to the local waste transfer facility.

2.3 On-Site Sewage (Septic) Treatment Systems

Dental practices served by septic or on-site sewage systems should be especially aware of the adverse impacts that heavy metals and chemicals may have on the effective functioning of the on-site sewage system. Since the breakdown of wastewater occurs as a result of bacterial processes, certain substances in dental wastes that are harmful to bacteria may disrupt the wastewater treatment process. Contaminants discharged to an on-site sewage system may impact groundwater and long-term discharge of heavy metal wastes may result in contaminated soils. Therefore dental practices served by septic systems should only discharge wastes that are not harmful to the bacterial process. Additionally to maintain optimal performance, wastewater flows should be minimized and regular inspections should be implemented.
3.0 DISPOSAL OF MERCURY CONTAINING WASTES

3.1 Scrap Amalgam

Rationale
Mercury has been declared a toxic substance under the Canadian Environmental Protection Act, 1999 (CEPA 1999). In addition, mercury containing wastes, including dental amalgam wastes, may be classified as hazardous wastes under Ontario Regulation 347. Further, municipal bylaws place concentration limits on mercury and other heavy metals that can enter the wastewater stream. Members of the dental community should ensure that minimal amounts of mercury containing wastes are released to the environment through common waste streams (sewage system, biomedical waste or regular garbage). Although there is little distinction between contact and non-contact amalgam within a dental practice, some waste carriers require the separation of scrap amalgam into contact and non-contact amalgam. Check with the waste carrier to ascertain their requirements.

Non-Contact Scrap Amalgam (amalgam that has not been placed in a patient’s mouth)

Disposal Options

BMP
- Separate non-contact amalgam from contact amalgam.
- Separate broken and unused capsules and manage as non-contact amalgam.
- Collect non-contact amalgam in a break resistant, air tight container (may be provided by waste carrier).
- Label the container "Non-contact Amalgam".
- When container is full, contact an approved waste carrier for recycling or disposal.
- For portable dental equipment and mobile dental units, transport the appropriately labelled container, when full, to a dental practice for recycling or disposal through an approved waste carrier.

Caution
- Do not dispose non-contact amalgam into the regular garbage.
- Do not wash non-contact amalgam particles down the drain.
- Do not place non-contact amalgam wastes into the biomedical waste container.

• Do not self-transport non-contact amalgam.
• For portable dental equipment and mobile dental units, do not dispose of non-contact amalgam at a remote site which does not have a disposal arrangement through an approved waste carrier.

Contact Scrap Amalgam (amalgam that has come into contact with a patient’s mouth)

Disposal Options

BMP
- Connect all dental units to an amalgam separator that meets or exceeds ISO 11143 standards
- Use disposable chair-side traps and filters in the dental units.
- Use standard precautions (nitrile gloves, safety glasses and face mask) when removing the chair-side trap, filter and vacuum pump filter from the dental unit.
- Place the entire trap and filter along with their contents into a break resistant, air tight container (may be provided by waste carrier).
- Close the lid tightly.
- Label the container: “Contact Amalgam”.
- As soon as the container is full, contact an approved waste carrier for recycling or disposal.
- Follow the manufacturer's instructions regarding equipment maintenance including how often traps and filters should be emptied.
- Follow the manufacturer’s directions on the management of amalgam wastes collected by the amalgam separator.
- For portable dental equipment and mobile dental units, transport the appropriately labelled container, when full, to a dental practice for disposal through an approved waste carrier.

Other Options
- Use standard precautions (nitrile gloves, safety glasses and face mask) when removing chair-side trap vacuum pump filter from the dental unit.
- Remove all visible amalgam by tapping the trap and filter contents into a container labeled “Contact Amalgam”.
- Close the lid tightly.
- If the trap and filter are visibly clean and disposable, place the trap and filter into the
Did You Know?
- Ontario Regulation 196/03, legislated under the Dentistry Act, requires every dental practice in Ontario in which dental amalgam is placed, repaired or removed to install and maintain a dental amalgam separator that meets or exceeds the ISO “Dental Equipment – Amalgam Separators” standard.
- There are a variety of amalgam separators available on the Canadian market that range in effectiveness, size, capacity and cost.
- Essentially, amalgam separators are designed to capture a higher percentage of the amalgam particulates that pass through the dental unit, thereby reducing the amount of amalgam that enters the wastewater stream. Manufacturers of amalgam separators that are certified under ISO Standard 11143 or its equivalent have proven that their separators capture 95% or more of all particulate amalgam that passes through the dental unit. Companies that are not certified under ISO or its equivalent standards have not demonstrated that their units capture more amalgam than do ordinary traps and filters.
- Traps and filters serve as a form of amalgam separation technology.
- Scrap plumbing, resulting from repairs or modifications to the dental practice, may be considered hazardous solid waste that should be disposed through an approved waste carrier.

Appendix E contains a list of suppliers of amalgam separator systems and a list of questions that should be asked when purchasing an amalgam separator system.

3.2 Stores of Elemental Mercury

Rationale
Because elemental mercury is a volatile liquid at room temperature, there is a risk of contamination of a dental practice with stores of elemental mercury, in the event of an accidental spill. As a result, members of the dental community should ensure, following a spill, that no amount of elemental mercury wastes are released to the environment through common waste streams (sewage system, biomedical waste or regular garbage). Precapsulated amalgam should be used in place of elemental mercury.
Disposal Options

BMP

- Store unused elemental mercury in an air-tight, break resistant container.
- Label the container: “Elemental Mercury”.
- Contact an approved waste carrier for recycling or disposal.
- Manage mercury spills properly and safely (refer to Appendix C for Managing Elemental Mercury).
- For portable dental equipment and mobile dental units, the appropriately labelled container containing the elemental mercury, should be transported to a dental practice for recycling or disposal through an approved waste carrier.

Caution

- Do not self-transport elemental mercury.
- Do not place elemental mercury in the garbage.
- Do not rinse elemental mercury down the drain.
- Do not dispose of elemental mercury with biomedical wastes.
- For portable dental equipment and mobile dental units, do not dispose of elemental mercury at a remote site which does not have a disposal arrangement through an approved waste carrier.
4.0 DISPOSAL OF SILVER CONTAINING WASTES

4.1 Spent X-ray Fixer and Developer

Rationale
Spent fixer solution containing silver may be classified as hazardous under Ontario Regulation 347 (depending on silver concentration). In addition, municipal bylaws place concentration limits on several heavy metals (including silver) that can enter the wastewater stream. Since fixer solutions are acidic and developer solutions are basic, release of these solutions to the sewer are also subject to municipal bylaws for pH. Therefore, to protect the environment, the dental community should:

- Ensure that silver containing wastes and untreated spent X-ray developer and fixer solutions are not released to common waste streams (sewage system, biomedical waste or regular garbage).
- Contact the supplier about a take-back and recycling program for X-ray developer and fixer solutions.

Disposal Options

BMP
- Separate developer and fixer solutions. If the X-ray film development processor pre-mixes fixer and developer solutions, an adapter kit may be purchased to keep these chemicals separate. Consult with the supplier.
- Collect solutions (fixer and developer) in separate containers provided by an approved waste carrier or supplier.
- Label the containers "X-ray Fixer" and "X-ray Developer" respectively.
- Once a container is full, contact an approved waste carrier for recycling or disposal.
- If less than 25 litres per month of developer is used, contact local municipality to determine whether developer can be discharged to the sewer.
- For portable dental equipment and mobile dental units, transport the appropriately labelled container, when full, to a dental practice for recycling or disposal through an approved waste carrier.

OR
- Purchase a silver recovery unit to reclaim silver from the fixer solution. Prior to purchasing the silver recovery unit, check with the local municipality to ensure that the level of silver removal meets the municipal sewer use by-law requirements.
- Once a cartridge is full, contact an approved waste carrier for recycling or disposal.
- Check with local municipality for guidance on pH limits to determine if neutralized developer (basic) and desilvered fixer (acidic) solutions can be discharged to the sewer. To neutralize solutions, mix developer and desilvered fixer solutions or alternatively use a neutralizing agent prior to discharge.

Other Options
- Collect mixed developer/fixer solution in the container provided by an approved waste carrier or supplier.
- Label the container "Mixed X-ray Developer/Fixer".
- Once a container is full, contact an approved waste carrier for recycling or disposal.

Caution
- Do not pour fixer down the drain unless it is desilvered. Some municipalities also require the neutralization of fixer solutions prior to discharge since the acidity of fixer solutions can corrode copper drainage pipes.
- Do not place silver recovery cartridges in the regular garbage.
- If the dental practice is discharging to a septic system, do not discharge the developer or fixer or any liquid that has gone through the silver recovery process into the septic system. This may disrupt the proper functioning of the septic system. Dispose of these wastes through an approved waste carrier.
- For portable dental equipment and mobile dental units, do not dispose of fixer or developer solutions in a remote location which does not have a disposal arrangement through an approved waste carrier.

4.2 X-ray Film

Rationale
Undeveloped film also contains silver and lead which are contaminants listed in Schedule 4 of Ontario Regulation 347. To protect the environment and comply with provincial regulations and municipal bylaws, the dental community should ensure that undeveloped film
is not released to common waste streams (sewage system, biomedical waste or regular garbage). Any unused film should be recycled. Developed film does not require special handling and should be recycled where possible or disposed as regular garbage.

**Disposal Options**

**BMP**

- Collect undeveloped film that is unusable and/or expired in a container supplied by an approved waste carrier or supplier.
- Once a container is full, contact an approved waste carrier for recycling or disposal.
- For portable dental equipment and mobile dental units, transport undeveloped X-Ray film in an appropriately labelled container to a dental practice for recycling or disposal through an approved waste carrier.

**Caution**

- Do not dispose undeveloped film into the regular garbage.
5.0 DISPOSAL OF LEAD CONTAINING WASTES

Rationale
Lead foil packets and lead aprons contain lead which may be classified under Ontario Regulation 347 as hazardous waste. Consequently, lead can contaminate the soil and groundwater if it is disposed to landfill. In addition, municipal bylaws place concentration limits on several heavy metals (including lead) that can enter the wastewater stream. Therefore, to protect the environment, the dental community should ensure that lead containing wastes are not released to common waste streams (sewage system, biomedical waste or regular garbage).

5.1 Lead Foil Packets
Lead foil packets must not be disposed to the general waste stream. If the dental practice does not participate in a recycling program set up by an X-ray film manufacturer, then the waste must be treated according to Ontario Regulation 347.

Disposal Options
BMP
- Collect lead foil packets in a container normally provided by an approved waste carrier or supplier.
- Contact a film manufacturer about participating in a recycling program
- For portable dental equipment and mobile dental units, transport all lead foil packets in an appropriately labelled container to a dental practice for recycling or disposal through an approved waste carrier.

OR
- Once a container is full, contact an approved waste carrier for recycling or disposal.

Caution
- Do not dispose lead foil packets into the regular garbage or with biomedical waste.
- Do not use lead foil packets for any secondary purpose.
- Do not provide lead foil packets to anyone to use for a secondary purpose.
- For portable dental equipment and mobile dental units, do not dispose of lead foil packets in a remote location which does not have a disposal arrangement through an approved waste carrier.

5.2 Lead Aprons
Lead aprons that are no longer in use must not be disposed to the general waste stream. Approved waste carriers must be utilized to transport and dispose of this waste.

Disposal Options
BMP
- Contact an approved waste carrier for recycling or disposal.
- For portable dental equipment and mobile dental units, transport all lead aprons to a dental practice for recycling or disposal through an approved waste carrier.

Caution
- Do not dispose lead aprons into the regular garbage.
6.0 DISPOSAL OF BIOMEDICAL/PATHOLOGICAL WASTES

Rationale
Dental practices generate a number of biomedical wastes including sharps, blood-soaked materials, and human tissue.\(^1\) Biomedical wastes are classified as hazardous wastes under Ontario Regulation 347. Dental practices must also handle biomedical wastes in accordance with Guideline C4, the Management of Biomedical Wastes in Ontario. The following wastes are not classified under the definition of biomedical waste provided the dental practice determines that the waste does not release liquid or semi-liquid blood or blood products if compressed:

- Extracted teeth
- Gauze
- Examination or surgical gloves
- Saliva soaked materials

The dental community should ensure that biomedical wastes are handled safely to protect human health and the environment. In general:

- All biomedical waste containers must be colour coded and marked with the universal biohazard symbol.
- Biomedical wastes must be released to an approved biomedical waste carrier, for transport to a facility that is approved to receive biomedical waste.
- The liquid content of regular garbage should be monitored and it is best to mix saliva soaked materials with other non-liquid types of garbage (e.g. paper towels, gloves).

6.1 Non-Anatomical Wastes (Blood-soaked materials)

Disposal Options

BMP

- Separate blood-soaked materials from sharps and anatomical biomedical wastes.
- Collect blood-soaked materials in yellow liner bags marked with the biohazard symbol, normally provided by a biomedical waste carrier.
- If blood-soaked materials are stored on site for more than four days refrigerate at temperatures at or below 4°C in a refrigerated area designated for biomedical/pathological wastes. Storage areas may be a stand-alone refrigeration/freezer unit. The enclosed storage area should be locked and separate from other supply areas. Clearly identify the area as a “Biomedical Waste Storage Area” and display the universal biohazard symbol.
- Contact an approved biomedical waste carrier for disposal.
- For portable dental equipment and mobile dental units, transport blood soaked materials in a properly labelled, sealed and approved yellow liner bag to a dental practice for disposal through an approved waste carrier.

Caution

- Do not dispose of blood-soaked materials with the regular garbage.
- Do not collect blood-soaked materials in the same container as sharps or anatomical biomedical wastes.
- For portable dental equipment and mobile dental units, do not dispose of blood soaked materials in a remote site which does not have a disposal arrangement through an approved waste carrier.
- Do not keep food in a biomedical waste storage area.

6.2 Non-Anatomical Wastes - Sharps:

Sharps containers are designed specifically for the containment and disposal of sharps such as needles, syringes with needles, scalpel blades, clinical glass, or other items capable of causing cuts or punctures. Sharps are to be placed into a puncture-resistant leak-proof container designed specifically for the management of sharps. If these containers are not resistant to penetration or compression, they pose a health risk to those involved in their handling and disposal. The containers must be able to resist puncture under general usage conditions and to the point of disposal. Needlestick and puncture wound injuries and resulting infections have been recorded in situations where sharps have been improperly handled and/or disposed. According to Health Canada’s Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care, all clinical sharps should be considered potentially infectious.

BMP

- Collect in a yellow, rigid, container that has a lid which cannot be removed once it has been permanently closed (containers are provided by a biomedical waste carrier).

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\(^1\) Human tissue waste generation
- Container must be marked with the universal biohazard symbol.
- Once the container is at capacity, contact an approved biomedical waste carrier for disposal.
- For portable dental equipment and mobile dental units, transport the appropriately labelled container, when full, to a dental practice for disposal through an approved waste carrier.

**Caution**
- Do not dispose of sharps with the regular garbage.
- Do not place other biomedical wastes or other classes of wastes in the sharps container.
- Do not fill sharps containers past the fill line or if no fill line exists, more than three-quarters full to prevent injury.
- For portable dental equipment and mobile dental units, do not dispose of sharps containers at a remote site which does not have a disposal arrangement through an approved waste carrier.

### 6.3 Anatomical Wastes (Human Tissue)

Human tissue waste generation is normally limited to oral surgeons and periodontists, for example, in the course of harvesting of human tissue for treatment. In this context, all human tissue wastes are required to be treated as biomedical/pathological wastes.

**BMP**
- Separate human tissue from sharps and blood soaked materials.
- Collect human tissue in red liners that are marked with the universal biohazard symbol (these liners are normally provided by a biomedical waste carrier).
- Store anatomical waste in an enclosed storage area that is locked and separate from other supply areas. Anatomical wastes should be stored at a temperature at or below 4°C. The storage area must be marked as a “Biomedical Waste Storage Area” and must display the universal biohazard symbol.
- Once accumulated, contact an approved biomedical waste carrier for disposal.
- For portable dental equipment and mobile dental units, transport human tissue wastes in an appropriately labelled and sealed red liner to a dental practice for disposal through an approved waste carrier.

**Caution**
- Do not dispose human tissue with the regular garbage.
- For portable dental equipment and mobile dental units, do not dispose of human tissue wastes in a remote facility which does not have a disposal arrangement through an approved waste carrier.
7.0 DISPOSAL OF CHEMICALS, DISINFECTANTS AND STERILIZING AGENTS

Rationale

The dental community uses a variety of chemicals for sterilizing, disinfecting and cleaning. Several of these cleaning/sterilizing products may contain active chemical ingredients (e.g. formaldehyde), that may be classified as hazardous under Ontario Regulation 347. In addition, many municipalities place concentration limits on chemicals released to the sewer. Before discharging chemicals into the sewer system, consult the local municipality for further information.

Some of these chemicals may be explosive if released to sewers in large enough quantities. Other chemicals may disrupt the microbial process that breaks down wastes in sewage or damage the drainage and sewer pipes over time. Additionally, certain chemicals may negatively impact the environment and human health. Using less harmful alternatives, cleaning methods and/or surface barriers can reduce the impact on the environment and the need for special handling of waste in the dental practice.

Disposal Options

BMP

- Follow the directions on Material Safety Data Sheets (MSDS) for the proper handling and disposal of all chemicals, disinfectants and sterilizing agents used in the dental practice.
- If any chemical has a flashpoint below 61°C (straight alcohols, ethers, acetone, xylol, chloroform or other solvents), contact the local municipality for disposal guidance.
- If any chemical has a pH less than or equal to 6.0 or greater than or equal to 10.5, contact the local municipality for disposal guidance.
- If any chemical contains formaldehyde and/or formalin, gluteraldehyde, ammonia or phenols, contact local municipality for disposal guidance.
- If any detergent contains nonyl phenol ethoxylates, contact the local municipality for disposal guidance. Nonyl phenols and its ethoxylates have been determined to be toxic substances as defined in Section 64 of CEPA 1999.
- Discard pharmaceutical wastes such as unused drugs and narcotics should be discarded through an approved waste carrier.
- Before discharging any other chemicals, disinfectants and sterilizing agents to the sewer ensure that Ontario Regulation 347 and all municipal sewer use limits are satisfied.
- Thoroughly rinse empty disinfectant containers and recycle or dispose of them in regular garbage.
- For portable dental equipment and mobile dental units, collect and transport chemicals, disinfectants or sterilizing agents in an appropriately labelled, sealed container to a dental practice for disposal through an approved waste carrier.

Caution

- Do not pour ignitableflammable substances (straight alcohols, ethers, acetone, xylol, chloroform) or other solvents down the drain.
- Do not pour X-ray cleaning solutions containing chromium down the drain. Hexavalent chromium compounds are deemed CEPA toxic. Furthermore, X-ray cleaning solutions containing chromium is classified as hazardous waste under Ontario Regulation 347.
- For portable dental equipment and mobile dental units, do not dispose of any accumulated chemicals, disinfectants, or sterilizing agents in a remote site which does not have a disposal arrangement through an approved waste carrier.
- If the dental practice is connected to a septic system, do not discharge sterilants or disinfectants like bleach and ammonia based cleansers. Both types of disinfectants may disrupt the proper functioning of the septic system. Use alternatives or collect discharge for pickup by an approved waste carrier. Additionally do not discharge chemical solvents and pharmaceuticals to the septic system since both may also disrupt its proper functioning. Consult the local municipality for further guidance.

Did You Know?

Some oxidizing line cleaner chemicals used in the dental practice cause the solubilization of mercury from historic buildup of amalgam in copper drainage pipes. Dental amalgam readily accumulates in drainage piping. Bleach (sodium hypochlorite, NaOCl), which is commonly used as a line cleanser, has been identified by the United States Naval Dental Research Institute as one of the most prolific solubilizers of mercury. Although ammonia
8.0 CHOOSING A WASTE CARRIER

Under provincial regulations, the generator of the waste is legally responsible for the proper disposal of hazardous wastes. To reduce liability, the following should be considered prior to entering into a service contract agreement:

- Confirm that the waste management company has a certificate of approval (CofA) for the transport of hazardous waste. A CofA would include multiple waste classes;
- Confirm that the waste disposal site has a CofA to receive hazardous wastes. Site CofA’s include multiple waste classes;
- Use recyclable containers provided by waste carriers, where possible;
- Consider a waste carrier that manages several classes of waste to simplify waste management services (cost, convenience, etc.);
- Preferred disposal methods
  - Recycling for metals (mercury, lead, silver)
  - Recycling of chemical wastes

Confirm that waste carrier complies with requirements under the TDGA (Transport of Dangerous Goods Act) requirements such as labelling and containment.

based cleansers do not solubilize mercury, when mixed with chlorinated tapwater, ammonia based cleansers may form chloramines. Both ammonia and chloramines have been determined to be CEPA toxic substances. Cleansers and disinfectants that are not oxidizing or ammonia based are available commercially. To ensure compliance with municipal sewer use bylaws, check with the local municipality for guidance.
9.0 REGULATORY FRAMEWORK

FEDERAL

9.1 Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal

The Basel Convention is an international agreement facilitated by the United Nations Environment Programme (UNEP) to provide for a comprehensive regime for both third party and environmental liability as well as adequate and prompt compensation for damage resulting from the transboundary movement of hazardous wastes and other wastes. The convention was ratified by Canada in 1992.

The main objectives of the Basel Convention are to:

- Ensure that the generation of hazardous waste is reduced to a minimum;
- As much as possible, dispose of hazardous wastes within the country of their generation;
- Establish enhanced controls on exports and imports of hazardous waste;
- Prohibit shipments of hazardous wastes to countries lacking the legal, administrative and technical capacity to manage and dispose of them in an environmentally sound manner; and
- Co-operate on the exchange of information, technology transfer, and the harmonization of standards, codes and guidelines.

http://www.ec.gc.ca/tmb/eng/tmbbasel_e.html

9.2 Canadian Environmental Protection Act (CEPA 1999)

The Canadian Environmental Protection Act, 1999 (CEPA 1999) is a federal Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development.

CEPA 1999 shifts the focus away from managing pollution after it has been created to preventing pollution. The Act provides the federal government with new tools to protect the environment and human health, establishes strict deadlines for controlling certain toxic substances, and requires the virtual elimination of toxic substances which are bioaccumulative, persistent and result primarily from human activity.

http://www.ec.gc.ca/CEPARegistry

9.3 Export and Import of Hazardous Wastes Regulations

The Export and Import of Hazardous Waste Regulations (EIHWWR), under the Canadian Environmental Protection Act (CEPA 1999), sets out conditions for movements of hazardous wastes, including recyclables, across the Canadian border. The EIHWWR ensures that transboundary movements of hazardous wastes destined for disposal, and hazardous wastes destined for recovery/recycling facilities, are handled in an environmentally sound manner. Proposed amendments to the EIHWWR, referred to as Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations, were published in Canada Gazette, Part I in March, 2004.

http://www.ec.gc.ca/CEPARegistry/regulations/

9.4 Fisheries Act

The Fisheries Act seeks to manage and protect Canada’s fisheries resources through ecologically sustainable utilization and to protect the marine and freshwater environment. Environment Canada administers subsection 36(3) which prohibits the deposit of deleterious substances into water frequented by fish.

http://www.ec.gc.ca/EnviroRegs/

9.5 Memorandum of Understanding (MOU) Respecting the Implementation of the Canada-wide Standard on Mercury for Dental Amalgam Waste

On February 18, 2002, the MOU Respecting the Implementation of the Canada-wide Standard on Mercury for Dental Amalgam Waste was signed by the federal Minister of the Environment, representing the Canadian Council of Ministers of the Environment (CCME), and the President of the Canadian Dental Association (CDA). A culmination of an initiative of the CCME that began in March 2000, the two parties negotiated this MOU to establish best practices for the management of dental amalgam waste and to assist in implementing the associated Canada-wide Standard (CWS) on Mercury for Dental Amalgam Waste. Environment Canada has agreed to support in a manner consistent with the MOU, the voluntary implementation of Best Management Practices (BMP) by the dental profession to achieve the objectives of the CWS.

The objective of the CWS is to substantially reduce releases of mercury in waste amalgam from dental practices through the adoption of BMP, which includes the installation, use, and maintenance of ISO certified traps or equivalent, by those dental practitioners generating amalgam wastes. Through voluntary compliance with the BMP, the CWS aims to achieve a 95% national reduction in mercury releases from dental amalgam waste discharges to the environment, by 2005, using...
a base year of 2000. “Reduction in mercury releases” refers to the amount of mercury, either in the form of elemental mercury or mercury containing compounds, removed from the dental waste stream.

The MOU respecting the implementation of the CWS on Mercury for Dental Amalgam Waste outlines the agreed responsibilities of Environment Canada and the CDA. Under the agreement, Environment Canada is committed to the following activities:

- With the assistance of the CDA, establish for the year 2000 baseline quantities of amalgam waste generated in Canada and baseline number of dentists practicing in Canada;
- Analyze amalgam waste collection data obtained from approved waste carriers in Canada;
- Identify sources of amalgam separators and waste management companies in each jurisdiction authorized to collect, transport and dispose of dental amalgam waste;
- Initiate and coordinate implementation efforts with other levels of government to facilitate national objectives such as the harmonization of regulatory requirements across Canada;
- Prepare articles for publication in CDA’s journals from 2002 to 2007 describing the progress of MOU implementation;
- Inform the CDA on the planning, execution and reporting of any research projects that investigate the environmental impacts of amalgam waste;

The CDA has agreed to the following:

- Seek commitment from the association’s Corporate Members and provincial Dental Associations;
- Promote the incorporation of training components in Canadian dental schools with support from Environment Canada;
- Develop mechanisms for tracking implementation of the BMP through partnerships with dental regulatory authorities and other appropriate organizations;
- Communicate and promote the CWS on Mercury for Dental Amalgam Waste to the dental profession and dental schools in Canada through the provision of appropriate information and periodic updates;
- Develop technical guidance documents for dental practitioners with help from Environment Canada;
- Provide to Environment Canada a baseline estimate of the number of Canadian dentists in year 2000, yearly BMP compliance reports based on annual surveys of individual dental practices, and information accounting the progress towards compliance with the CWS on Mercury for Dental Amalgam Waste in Canada.

Environment Canada and the Canadian Dental Association have agreed to work together to:

- Incorporate dental amalgam waste BMP training in Canadian dental school curricula;
- Participate in joint projects with appropriate partners to implement the CWS;
- Develop a process for verification of equipment equivalent to the criteria stated in the ISO 11143;
- Produce annual summary reports outlining the progress made in the implementation of the MOU for presentation to CCME and CDA’s Board of Governors.

Dental specialties exempt from full voluntary compliance with the CWS on Mercury for Dental Amalgam Waste are as follows:

- Orthodontics and dentofacial orthopedics
- Oral and maxillofacial surgery
- Oral medicine and pathology
- Oral and maxillofacial radiology
- Periodontics

This MOU will be in effect until December 31, 2007, in order to conform to the objectives of CWS on Mercury for Dental Amalgam Waste, which is to be met by 2005, with public reporting in 2007.

http://www.ccme.ca/assets/pdf/cws_merc_amalgam_e.pdf

9.6 The Canada-Ontario Agreement Respecting the Great Lakes Basin

The new Canada Ontario Agreement (COA) will continue progress towards the virtual elimination of persistent bioaccumulative toxic substances, and the significant reduction of other harmful pollutants. Mercury is one of those substances. The COA focuses on work to restore, protect and conserve the Great Lakes. The COA helps Canada meet its goals under the Canada-U.S. Great Lakes Water Quality Agreement (GLWQA). The GLWQA aims to tackle the most pressing issues of the Great Lakes ecosystem.

http://www.on.ec.gc.ca/coa/

9.7 The Canada United States Great Lakes Binational Toxics Strategy (GLBTS)

Signed in 1997, the Great Lakes Binational Toxics Strategy (GLBTS) is an agreement between Canada
and the United States to virtually eliminate persistent toxic substances from the Great Lakes environment. Environment Canada, the United States Environmental Protection Agency and stakeholders from industry, academia, state/provincial and local governments, Tribes, First Nations, and environmental and community groups are working together to achieve the Strategy’s challenge goals. Substance-specific workgroups are working to eliminate Level 1 substances, including mercury from the Great Lakes Basin.

http://www.epa.gov/glnpo/bns/

9.8 Transportation of Dangerous Goods Act (TDGA)
The Transportation of Dangerous Goods Act and the associated Transportation of Dangerous Goods Regulations which was adopted by all provinces and territories establishes the safety requirements for the transportation of dangerous goods which includes hazardous wastes. The Act also requires that proper labels are attached to containers and vehicles used to transport the dangerous goods.

http://www.tc.gc.ca/acts-regulations/

PROVINCIAL (Ontario)

9.9 Building Code Act, 1992
In 1998, the responsibilities with respect to on-site sewage systems that service properties with a total daily design sewage flow-rate of less than 10,000 litres were transferred from the Environmental Protection Act, RSO 1990 (EPA) to the Building Code Act (BCA) which is administered by the Ontario Ministry of Municipal Affairs and Housing. Facilities with discharges greater than 10,000 L/day are still regulated under the Ontario EPA. The BCA defines an on-site sewage system as a “building” and regulates the construction, operation and maintenance of on-site sewage systems. The issuance of building permits and enforcement for septic systems is administered by municipal governments.

http://www.obc.mah.gov.on.ca/

9.10 Ontario Environmental Protection Act, R.S.O. 1990 (EPA)
The Ontario Environmental Protection Act defines the legal framework within which issues related to the environment that are not in the exclusive jurisdiction of the federal government, are governed in the province of Ontario. This Act is administered by the Ontario Ministry of the Environment (MOE). Based on this framework, regulations and guidelines have been developed to provide specific direction and guidance.

http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90e19_e.htm

9.11 Ontario Guideline C4: The Management of Biomedical Wastes in Ontario
In support of Ontario Regulation 347 under the Ontario Environmental Protection Act, RSO 1990, this guideline defines biomedical waste and provides guidance for the management of this waste stream, including criteria for handling, packaging, transportation, treatment and disposal.

http://www.ene.gov.on.ca/envision/gp/425e.pdf

9.12 Ontario Occupational Health and Safety Act (OHSA), Regulation 844: Designated Substance-Mercury
Under the OHSA, toxic and hazardous substances are controlled under the Designated Substance Regulation. This regulation specifically sets out the amount of mercury that workers can be exposed to in a given time period and the methods to both control and measure mercury in the workplace.

http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900844_e.htm

While in the dental practice, containers of hazardous waste do not have to be labeled according to the Transportation of Dangerous Goods Act. However, containers must comply with Workplace Hazardous Materials Information System (WHMIS) requirements. Under OHSA Reg. 860, WHMIS requires that workplace labels are attached to containers used for storing controlled products produced in the dental practice (dental wastes containing controlled products). Workplace labels should indicate as a minimum:

- Name of the waste;
- Safe handling of the waste;
- Availability of Material Safety Data Sheets (MSDS); and
- WHMIS hazard symbol, if appropriate.

http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900860_e.htm

9.14 Ontario Regulation 347: General - Waste Management under EPA
According to the Ontario Regulation 347: General-Waste Management under the Environmental Protection Act (Ontario), hazardous wastes must be:

- collected and transported by waste management companies that are approved by the Ministry of the Environment (MOE).

Companies or individuals that transport hazardous wastes must have a waste management Certificate of
Approval that is issued by the MOE. Under Ontario Regulation 347, it is the dentist’s responsibility to ensure that wastes generated (including mercury/lead/silver containing wastes and biomedical/pathological wastes) will be collected by an approved hazardous waste carrier appropriate to the waste class. The waste class refers to the type of waste that a waste carrier can manage. As a member of the dental community,

- Do not transport these wastes yourself;
- Do not allow any staff member to transport these wastes.

Waste carriers are approved to transport specific waste classes; they may not be approved to transport all waste classes. As a result,

- Several waste carriers may be required to transport different classes of hazardous wastes generated by a dental practice;
- Various containers for different classes of hazardous wastes may be provided by the approved waste carriers.

All members of the dental community should be aware of the final fate of the hazardous wastes generated by their practices, and should use companies that send wastes for recycling as opposed to incineration or disposal. Recycling reduces the overall impact that dental materials have on the environment.

http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900347_e.htm

9.15 Ontario Regulation 196/03, amending O. Reg. 205/94: Amalgam Waste Disposal

On May 31st, 2003, Ontario Regulation 205/94 under the Dentistry Act 1991 was amended to include the Standard of Practice of the Profession for Amalgam Waste Disposal. This regulation requires that every dental office in the province of Ontario in which dental amalgam is placed, repaired or removed, install a dental amalgam separator device. The device must meet or exceed ISO 11143 standards.

This regulation came into effect on November 15, 2003. The regulation also requires dental offices that meet the above conditions to dispose of amalgam wastes properly.

http://www.e-laws.gov.on.ca/DBLaws/Source/Regs/English/2003/R03196_e.htm

MUNICIPAL AND OTHER

9.16 CSA Z316.6 - Standard for the Evaluation of Single Use Medical Sharps Containers for Biohazardous and Cytotoxic Waste

In 2002, the Canadian Standards Association released the second edition of Evaluation of Single Use Medical Sharps Containers for Biohazardous and Cytotoxic Waste. This standard specifies criteria for:

- Puncture resistance;
- Physical integrity of containment;
- Thermal integrity during exposure to high temperature steam sterilization;
- Fill capacity;
  - Containers shall have a visible fill capacity indicator with a prominent warning statement: “DO NOT OVERFILL”;
- Colour-coding, labelling and symbols;
  - Containers shall be colour-coded yellow for biohazardous medical sharps and red for cytotoxic medical sharps;
  - The universal biohazard symbol shall be permanently affixed to an outer surface of the container with the legend: BIOHAZARD and able to withstand all normal working, handling and environmental conditions.

http://hct.csa.ca/

9.17 Municipal Sewer-Use By-laws

The disposal of dental wastes is also controlled through municipal sewer use by-laws, which may place limits on the concentrations of heavy metals (and other hazardous substances) that can be discharged to the sewer system. Discharges of the following substances are restricted:

- Heavy metals (including mercury and silver);
- Ignitable/flammable chemicals (straight alcohols, ethers, acetone, xylol, chloroform); and
- Other solvents.

Local bylaws may vary from municipality to municipality. Contact local municipalities for specific requirements.
10.0 GLOSSARY

Anatomical waste (based on Ontario’s C4 guideline)

Human anatomical waste consisting of human tissues, organs and body parts, but does not include extracted teeth, hair or nails.
Source: http://www.ene.gov.on.ca/envision/gp/425e.pdf

Biomedical waste

Waste that is generated by human or animal health care facilities, medical research and teaching establishments, health care teaching establishments, clinical testing or research laboratories, professional offices of doctors, dentists, veterinarians, mortuaries, funeral establishments, and from mobile health care activities.

BMP (Best Management Practices):

The best disposal option available. It prevents or minimizes the release of toxic substances to the environment from dental practice. Pollution prevention is the preferred choice where possible.
Source: http://www.fmd.uwo.ca/dentistry/docs/waste.pdf

Contact amalgam

Dental amalgam that has been in contact with the patient. Examples are extracted teeth with amalgam restorations or amalgam captured by chair side traps, filters or screens.
Source: http://greenlanedev.ncr.ec.gc.ca/MERCURY/images/EC_CDA_MOU.pdf

Contamination (Water)

Water is considered contaminated if it contains chemical or biological pollutants that are harmful to human health or the environment.
Source: http://www.ec.gc.ca/glossary_e.html

Dental Community

An inclusive term referring to dentists, dental hygienists, dental assistants and receptionists, educators, students and other personnel with responsibilities in any given dental practice.

Dental Practice

A variety of practice settings that encompass physical, social, cultural and economic factors that interact in both predictable and unpredictable ways. The practice is influenced by legislation, the public, employment philosophies and practices, and research and technology.

Ecological footprint

The land and water area that is required to support indefinitely the material standard of living of a given human population, using prevailing technology. Human activities such as eating, traveling, heating homes, and purchasing consumer items all contribute to the material standard of living. It was invented by Dr. Mathis Wackernagel and Dr. William Reese, co-authors of Our Ecological Footprint: Reducing Human Impact on the Earth (New Society Publishers).
Source: http://www.ecouncil.ac.cr/rio/focus/report/english/footprint/glossary.htm

Ecosystem

A biological community of interacting organisms and their physical environment.
Source: http://www.ec.gc.ca/glossary_e.html

Effluent

Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial facility. Generally refers to wastes discharged into surface waters.
Source: http://environment.about.com/

Elemental mercury

The purest form of the naturally occurring element, mercury. It is the only heavy metal that is in liquid state at room temperature and thus it is also popularly known as “liquid silver”. It volatilizes readily when exposed to the atmosphere and can be transported long distances through the air before being deposited on land or in water. Elemental mercury has an atomic mass of 200.5 with an atomic number of 80 and it is identified with the chemical symbol Hg⁰.

Hazardous waste

Any waste that is corrosive, ignitable or toxic and harmful to human health and the environment. Hazardous wastes range from common household products like cleaning products, used oil, oil-based paints to complex chemicals used in the dry cleaning industry and during manufacturing processes.
Source: http://www.ene.gov.on.ca/envision/land/hazardouswaste.htm

Local waste transfer facility

In the context of mobile dental practice, it is the dental practitioner’s office (fixed location) or a facility
operating under a Certificate of Approval which authorizes the acceptance of hazardous waste.

Non-anatomical waste (based on Ontario’s C4 guideline)

- Human and animal cultures, stocks or specimens, excluding urine and faeces submitted for analysis, live or attenuated vaccines, cell lines, and material that has come into contact with any of the above items;
- Human liquid blood or semi-liquid blood and blood products, items contaminated with blood or blood products that would release liquid or semi-liquid blood if compressed, body fluids visibly contaminated with blood, and body fluids removed in the course of surgery, treatment, autopsy, embalming or for diagnosis, excluding urine and faeces;
- Sharps including needles, needles attached to syringes, and blades; or
- Broken glass or other materials which are capable of causing punctures or cuts and which have come into contact with human blood or body fluid or in contact with animal blood or animal body fluid.

Source: http://www.ene.gov.on.ca/envision/gp/425e.pdf

Non-contact amalgam

Amalgam waste that has never been in a patient’s mouth. It is generally surplus amalgam left after a new restoration has been completed.

Source: http://greenlanedev.ncr.ec.gc.ca/MERCURY/images/EC_CDA_MOU.pdf

Pathological waste

- Any part of the human body, including tissues and bodily fluids, but excluding fluids, extracted teeth, hair, nail clippings and the like, that are not infectious,
- Any part of the carcass of an animal infected with a communicable disease or suspected by a licensed veterinary practitioner to be infected with a communicable disease, or
- Non-anatomical waste infected with a communicable disease;

Source: http://www.e-laws.gov.on.ca/DBLaws/Regs/English/900347_e.htm

Pollution

Any substance that is present in or has been introduced into the environment and has harmful or unpleasant effects. Pollution comes in many forms, and may be present in air, land, water, or organisms.

Although some pollution is from natural sources, most is produced by human activities.

Source: http://www.ec.gc.ca/glossary_e.html

Pollution Prevention

The use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health. Common pollution prevention practices include:

- Product design and reformulation
- Equipment modifications and process changes
- Materials and feedstock substitution
- Operating efficiencies and training
- Purchasing techniques and inventory management
- On-site reuse and recycling


Recycling

The process by which materials otherwise destined for disposal are collected, reprocessed, or remanufactured and are reused.

Scrap amalgam

Excess and/or waste dental amalgam (contact and non-contact) which consisting of mercury, silver and other metals. CAUTION : Common dental amalgam is a silver/mercury alloy and should be treated with the proper handling and packaging methods to ensure the containment of mercury vapours and mercury exposure.

Source: http://www.recycle.net/spec/gr070330.html

Spill

An uncontrolled, unplanned, unintentional or accidental discharge of a pollutant from a container, structure or vehicle.

Standard Precautions

An expansion of the elements of universal precautions into a standard of care designed to protect dental health care professionals and patients from pathogens that can be spread by blood or any other body fluid, excretion, or secretion. Standard precautions apply to contact with 1) blood; 2) all body fluids, secretions, and excretions (except sweat), regardless of whether they contain blood; 3) non-intact skin; and 4) mucous membranes.

Source: http://www.cdc.gov/mmwr/PDF/rr/rr5217.pdf
Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In other words, development is essential to satisfy human needs and improve the quality of human life. At the same time, development must be based on the efficient and environmentally responsible use of all of society’s scarce resources - natural, human, and economic.

Source:  http://www.ec.gc.ca/glossary_e.html

Toxic Substances

Section 64 of CEPA 1999 defines a substance as “toxic” if it enters or may enter the environment in a quantity or concentration or under conditions that:

- Have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
- Constitute or may constitute a danger to the environment on which life depends; or
- Constitute or may constitute a danger in Canada to human life or health.

Schedule I of CEPA 1999 is a List of Toxic Substances. Environment Canada can use various tools to manage the risks of toxic substances. Risk management tools can include regulations, pollution prevention plans, environmental emergencies plans, codes of practice, environmental quality objectives or guidelines, other federal/provincial/territorial acts and regulations, Canada Wide Standards, and economic instruments. In addition, voluntary approaches including Environmental Performance Agreements and Memoranda of Understanding can be used.

Source:  http://www.ec.gc.ca/ceparegistry/

Toxic waste

Waste that poses a significant hazard to the environment or to human health when improperly handled; includes carcinogenic, mutagenic, teratogenic or phytotoxic wastes, or wastes harmful to aquatic species, or poisonous wastes.

Source:  http://glossary.eea.eu.int/EEAGlossary/T/toxic_waste

Waste Management

Disposal, processing, controlling, recycling, and reusing the solid, liquid, and gaseous wastes of plants, animals, humans, and other organisms. It includes control within a closed ecological system to maintain a habitable environment. Some of the waste materials involved are hazardous while others are simply so voluminous that their permanent disposal becomes a problem.

Source:  http://www.ec.gc.ca/glossary_e.html
Appendix A  DENTAL WASTE BEST MANAGEMENT PRACTICES FLOWCHARTS

Best Management Practices for the Disposal of Biomedical/Pathological Wastes in Ontario

Biomedical Wastes: Separate human tissue, sharps & blood soaked materials

- Anatomical
  - Human Tissue
    - Collect in a RED liner bag - label with Biohazard symbol
    - Store in lockable “Biomedical Waste Storage Area” @ < 4°C

- Blood Soaked Materials
  - Collect in a YELLOW liner bag - label with Biohazard symbol

- Sharps (needles, scalpels, other sharp objects)
  - Collect in YELLOW rigid, puncture resistant, CSA approved or equivalent container - label with Biohazard symbol

- Teeth with amalgam fillings
  - Refer to Dental Amalgam & Mercury Wastes Flowchart

- Teeth without amalgam fillings
  - Dispose with regular garbage

- Teeth
  - Saliva-soaked Gauze or other material
    - Mix with non-liquid types of garbage

- Non-Anatomical
  - Human Tissue
    - Collect in a RED liner bag - label with Biohazard symbol
    - Store in lockable “Biomedical Waste Storage Area” @ < 4°C

- Blood Soaked Materials
  - Collect in a YELLOW liner bag - label with Biohazard symbol

- Sharps (needles, scalpels, other sharp objects)
  - Collect in YELLOW rigid, puncture resistant, CSA approved or equivalent container - label with Biohazard symbol

- Teeth with amalgam fillings
  - Refer to Dental Amalgam & Mercury Wastes Flowchart

- Teeth without amalgam fillings
  - Dispose with regular garbage

- Teeth
  - Saliva-soaked Gauze or other material
    - Mix with non-liquid types of garbage

1. Human tissue waste generation is normally limited to oral surgeons and periodontists, for example, in the course of a harvesting of human tissue for treatment. In this context, all human tissue wastes are required to be treated as biomedical/pathological wastes.

2. Teeth, gauze with minimal traces of blood (i.e. does not release blood if compressed), gloves with minimal traces of blood and saliva soaked materials are not biomedical wastes.
Dental practices discharging to a private septic system should consult local municipality for guidance on this class of dental waste.

1. Developer solution is basic and desilvered fixer solution is acidic. Some municipalities may require mixing of these two solutions prior to discharge for neutralization of pH.
Best Management Practices for the Disposal of Lead Containing and Other Chemical Wastes in Ontario

Dental practices discharging to a private septic system should consult local municipality for guidance on this class of dental waste.

- **Lead Containing Wastes**
  - Lead Foil Packets
  - Lead Aprons

- **Disinfectants, Sterilants & Cleaning Chemicals**

Consult MSDS and/or supplier for chemical composition & properties

Consult municipality for sewer use bylaws - refer to Chemical List

**Chemical List**:  
- Chemiclave solution  
- Chromium  
- Ethers  
- Fluoride  
- Formaldehyde & Formalin  
- Nonyl Phenol based detergents

Participate in Manufacturer’s Recycling program

Release to approved waste carrier for disposal and/or recycling

Safe to discharge?

**Safety**

Safe for disposal to sewer

1. Consult supplier for chemical composition information if the composition of proprietary chemical mixture is not listed in the supplied Material Safety Data Sheet (MSDS).
2. This list is not exhaustive since different municipalities have different sewer use requirements. Please contact local municipality for local requirements.

Dental practices discharging to a private septic system should consult local municipality for guidance on this class of dental waste.

1. There are different configurations of traps, cuspidors etc. All dental amalgam particles collected by any configuration should be treated as contact amalgam.
2. Where separation between contact and non-contact amalgam is not required by the Approved Waste Carrier, all amalgam wastes may be placed in a single container labelled “Scrap Amalgam”.
3. Check with local municipality whether empty amalgam capsules are recyclable.

1. Amalgamated in Office
2. Dental Amalgam Supply
3. Encapsulated Amalgam
4. Broken and Unused Capsules
5. Empty Amalgam Capsules
6. Placement: Amalgam filling
7. Collection: Elemental Mercury (Hg)
8. Chairside Traps & Screens
9. Removal by Suction: Amalgam particles
10. Amalgam Separator
11. Vacuum Filter Pump
12. Collected Contact Amalgam Particles
13. Collect excess Non-Contact Amalgam
14. Place in air tight container and label: “Elemental Mercury”
15. Place in air tight container & label: “Contact Amalgam”
16. Place in air tight container & label: “Non-Contact Amalgam”
17. Release to approved waste carrier for disposal and/or recycling
18. Recycle or dispose with regular garbage
Appendix B

DENTAL PRACTICE DESIGN AND BASIC REQUIREMENTS CHECKLIST (for dental waste management)

Labels for containers containing hazardous wastes pursuant to hazardous waste regulations.

![Biohazard Symbol]

- **√** Biomedical waste area
  - Will be required to comply with Biomedical Waste guideline C4 if anatomical waste is stored on-site and if non-anatomical wastes are stored on-site for longer than four days.

- **√** Seamless non-absorbent flooring
  - Reduce the risk of contamination in the event of accidental spills of liquid mercury or other chemicals.

- **√** Nitrile gloves
  - Nitrile gloves are as safe or safer than other types of latex or rubber gloves and does not contain latex for those who may be allergic to this material.

- **√** Sharps container
  - Canadian Safety Association approved or equivalent – yellow in colour and marked with the biohazard sign

- **√** Spill kits
  - Various types (elemental mercury, chemical, etc. dependent on operation of the practice)

For the mercury spill clean-up procedure, please refer to appendix C.
MANAGING ELEMENTAL MERCURY (Storage and Spills)

The threat of a mercury (Hg) spill is most pronounced in dental practices that use or store elemental (liquid) mercury. The best way to eliminate the chance of a mercury spill is to switch to pre-capsulated amalgam. If elemental mercury is used however, use a proper work area that is designed to provide secondary containment (i.e. mix mercury on a tray that will capture the mercury should it spill) and follow a written mercury spill clean up procedure. Seamless non-absorbent flooring will reduce the risk of contamination in the event of an accidental spill of elemental mercury or other chemicals. For this reason porous surfaces such as mats and carpets should not be used in dental practices. If historic spills have occurred in a dental practice, patients and staff may be exposed to mercury vapour. Historic mercury spill clean-up may be required under OHSA and WHMIS.

All dental practices that deal with elemental mercury should be equipped with a mercury spill kit which includes nitrile gloves (nitrile gloves are safest for handling elemental mercury). A spill response plan should be developed and communicated to existing and new staff as part of the WHMIS training requirements. Mercury spill kit contents and spill clean up procedures are provided below.

Mercury Spill Kit

Required List
- Nitrile examination gloves
- Safety glasses and face mask
- Scoop with scraper (may be stiff paper)
- Sealable bags or bottles (for secure disposal of Hg cleanup items)
- Absorbent material that amalgamates Hg (powder or sponge form) or alternatively powdered sulphur
- Instruction Guide

Optional List
- Wash bottle (light water spray immobilizes Hg droplets)
- Mercury vapour rated respirator
- Aspirators with tube or eyedropper (to suction the Hg)
- Indicator powder (for detecting Hg in hard to reach places)
- Hg vacuum (hard to reach droplets of Hg)
- Duct tape or other sealing material
- Note: Commercial suppliers of mercury spill kits may not supply all of the above items in a kit.

Mercury Spill Cleanup Procedure

A small spill is considered equivalent to the amount in half of a teaspoon or 2.5 ml which is equivalent to 34 grams of mercury.

Secure spill area and determine the extent of the spill
1. Remove everyone not involved with cleanup from the vicinity of the mercury spill. DO NOT allow assistance from children or pregnant women.
2. If the spill is small and on a non-porous area such as linoleum or marble flooring, or on a porous item that can be discarded (like a small rug or mat), begin clean-up procedure immediately.
3. Although rugs should not be used in dental practices, if a spill occurs on a rug, on upholstery or in cracks or crevices, it may be necessary to contact an environmental professional.
4. Use a commercially available mercury spill kit if available and follow its instructions for cleanup of the spill.
5. Large spills of more than half of a teaspoon should be reported to the Ontario Spills Action Centre hotline at 1 (800) 268-6060, where instructions will be provided on how to manage the spill cleanup.

Spills: Less than or equal to the amount in half of a teaspoon
1. Check to see if anyone or any porous items (such as apparel of floor mats) have been splashed with mercury. If so, contaminated items should be removed and double (minimum) or triple wrapped in a plastic or sealable bag and sealed before leaving the spill site. Mercury on the skin should be wiped off with paper towel/tissue a paper towel moistened with water which should also be placed in the plastic bag.
2. If you are using powdered sulphur, sprinkle it over the spill area at this time. The sulphur does two things: (1) it makes the mercury easier to see since the colour changes from yellow to brown and (2) it prevents the mercury from vapourizing. Powdered sulphur may be purchased at garden supply houses or pharmacies. Please note that powdered sulphur may stain fabrics a dark color. Alternatively you can use mercury absorbent powders provided in commercial mercury spill kits to immobilize the spilled mercury.
3. If skin is broken due to broken glass and if mercury has come into contact with the cut, seek medical attention immediately. Although less serious, medical attention is recommended even if mercury has not come in contact with the cut. In extreme cases blood and urine tests may be necessary to determine exposure.

4. Close all interior doors leading to other indoor areas. Turn off ventilation, heating or air conditioning systems that could circulate air from the site of the spill to other areas of the building or dental practice.

5. Open windows and exterior doors to ventilate the area. Use a fan if necessary. The danger of mercury exposure is much greater in poorly ventilated areas. Lower the thermostat if possible. Lowering the temperature decreases vaporization of mercury.

6. Remove metallic jewellery because it can form bonds with mercury (amalgamation).

7. Put on nitrile rubber gloves and safety glasses.

8. If there are any broken pieces of glass or sharp objects, pick them up with care. Place all broken objects on a paper towel. Fold the paper towel and place in a zip lock bag. Secure the bag and label the bag accordingly (i.e. broken glass).

9. Use a squeegee or cardboard to gather mercury beads. Use slow, sweeping motions to keep mercury from becoming uncontrollable. Use a flash light to look for any additional mercury beads that may be sticking to the surface or in small cracked areas of the surface.

10. Use the eyedropper to collect or draw up the mercury beads. Slowly and carefully squeeze mercury onto a damp paper towel. Place the paper towel in a zip lock bag. Secure the bag and label the bag accordingly (i.e. broken glass).

11. Place all materials used with the cleanup and all mercury beads and contaminated objects into garbage bags double (minimum) or triple wrapped. Tightly seal the bags and label them “Elemental Mercury: Hazardous Waste”. Remember to place gloves in garbage bag.

12. Contact an approved hazardous waste carrier for mercury recovery and recycling or disposal.

13. Continue to ventilate the cleanup area with outside air, using fans if necessary, for a minimum of two days if possible. In an office building, increase the air exchange rate for one day. Continue to keep children and pregnant women out of cleanup area during this period.

14. Sprinkle sulphur powder on the spill area after cleaning up the mercury (a colour change from yellow to brown indicates that mercury is still present).

Caution:

- **Do Not Put Contaminated Items in the Washing Machine** - mercury may contaminate the machine and pollute the sewage system.
- **Do Not Vacuum** - vacuuming a mercury spill with a conventional vacuum cleaner may increase the mercury vapour in the air and increase the risk of inhalation. The vacuum cleaner may be contaminated and may have to be treated as hazardous waste.
- **Do Not Use a Broom or Brush** - sweeping or brushing up a spill will scatter mercury droplets, making them harder to find and clean up.
- **Do Not Pour Mercury Down the Drain** - mercury may complex with the copper piping in the plumbing and may be a source of mercury contamination in the drainage system. If discharged, it can contaminate septic systems or sewage systems.
- **Do Not Wear Shoes or Clothing That Might Be Contaminated with Mercury** - mercury contamination can be spread through shoes or clothing. Treat all materials contaminated with mercury including shoes and clothing as hazardous waste.
- **Do Not Dispose Mercury or Contaminated Items in the Regular Garbage** - mercury may be released as vapour or from waste incinerators or as leachate from landfill sites.

Spills: More than the amount in half of a teaspoon

1. Isolate the area.
2. Turn down temperature to reduce vaporization of mercury.
3. Open windows to ventilate.
4. Do not allow anyone to walk through the area in the vicinity of the mercury spill.
5. Never use vacuum to collect liquid mercury.
6. Contact Ontario’s Spills Action Centre hotline at 1 (800) 268-6060.
## Appendix D

**LIST OF APPROVED HAZARDOUS WASTE CARRIERS SERVING ONTARIO AS OF APRIL, 2005**

<table>
<thead>
<tr>
<th>Company Name and Address</th>
<th>Phone Number</th>
<th>Service Area</th>
<th>Elemental Mercury</th>
<th>Dental Amalgam</th>
<th>X-Ray Solutions (Silver) / Undeveloped Film</th>
<th>Lead Foil Packages</th>
<th>Sharps / Biomedical</th>
<th>Certificate of Approval to Transport</th>
<th>Other Certifications</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>2R Services Inc.</td>
<td>(705) 733-2573 / (800) 668-8475</td>
<td>Central, South Central, Eastern, Near North</td>
<td>† International marine salvage</td>
<td>† unused only hazardous secure landfill</td>
<td>† water treatment plant</td>
<td>† hazardous secure landfill</td>
<td>† hazardous waste</td>
<td>Certified in everything but biomedical, sharps, explosives</td>
<td><a href="http://www.theapxgroup.com">www.theapxgroup.com</a></td>
<td></td>
</tr>
<tr>
<td>Apex Environmental Systems</td>
<td>(800) 465-2739 / (905) 836-9220</td>
<td>Southern Ontario (All Ontario)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Assured Transport</td>
<td><a href="http://www.apex-environmental.com">www.apex-environmental.com</a></td>
<td></td>
</tr>
<tr>
<td>Clean Harbors</td>
<td>(800) 263-2436 / (905) 227-7872</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Assured Transport</td>
<td><a href="http://www.cleanharbors.com">www.cleanharbors.com</a></td>
<td></td>
</tr>
<tr>
<td>DBC Environmental Services</td>
<td>(613) 537-2255</td>
<td>Eastern Ontario</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Lacombe waste</td>
<td><a href="http://www.safety-kleen.com">www.safety-kleen.com</a></td>
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<tr>
<td>Detox Environmental Ltd.</td>
<td>(905) 623-1367</td>
<td>All Ontario</td>
<td></td>
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<td></td>
<td></td>
<td>Landfill</td>
<td><a href="http://www.drummake.com">www.drummake.com</a></td>
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<tr>
<td>Environmental Control Systems</td>
<td>(705) 725-0940</td>
<td>All Ontario</td>
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<td></td>
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<td></td>
<td></td>
<td>Quantex Technologies</td>
<td><a href="http://www.safety-kleen.com">www.safety-kleen.com</a></td>
<td></td>
</tr>
<tr>
<td>Fluorescent Lamp Recyclers Inc.</td>
<td>(519) 740-3334 / (800) 349-9018</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Notanda Mining &amp; Exploration-Geo Div</td>
<td><a href="http://www.healthsafetysystems.com">www.healthsafetysystems.com</a></td>
<td></td>
</tr>
<tr>
<td>Kodak Environmental Services</td>
<td>(800) 465-6325 / (416) 766-8233 ext. 35190</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Certified for mercury in reusable sharps</td>
<td><a href="http://www.kodak.com">www.kodak.com</a></td>
<td></td>
</tr>
<tr>
<td>Medical Waste Management</td>
<td>(866) 836-6660 / (905) 789-6660</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inclusion in this list is not an endorsement for any company. Information on this list may change without notice. This list is for general information purposes only.</td>
<td><a href="http://www.mediwaste.com">www.mediwaste.com</a></td>
<td></td>
</tr>
<tr>
<td>Owl Environmental Inc.</td>
<td>(905) 637-2104</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Certified in only small quantities—not very dental related</td>
<td><a href="http://www.owleco.com">www.owleco.com</a></td>
<td></td>
</tr>
<tr>
<td>Phillip Services Corporation</td>
<td>(905) 293-9465 / (888) 946-5959</td>
<td>Niagara Falls to GTA (All Ontario)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Certified in everything but biomedical</td>
<td><a href="http://www.philipservices.com">www.philipservices.com</a></td>
<td></td>
</tr>
<tr>
<td>Photo Tech Environmental</td>
<td>(677) 938-9465 / (905) 938-9465 / (905) 888-9465</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Certified in all but biomedical</td>
<td><a href="http://www.photech-env.com">www.photech-env.com</a></td>
<td></td>
</tr>
<tr>
<td>Provincial Environmental</td>
<td>(905) 577-0575</td>
<td>All Ontario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Certified in everything except PCB, biomedical and radioactive</td>
<td><a href="http://www.safety-kleen.com">www.safety-kleen.com</a></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix D  
### LIST OF APPROVED HAZARDOUS WASTE CARRIERS SERVING ONTARIO AS OF APRIL, 2005

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<th>Phone Number</th>
<th>Service Area</th>
<th>Certificate of Approval to Transport</th>
<th>Other Certifications</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantex Technologies</td>
<td>(519) 748-5348</td>
<td>All Ontario</td>
<td>√ Owl Environmental √ Owl Environmental √ Owl Environmental √ Owl Environmental</td>
<td>√</td>
<td><a href="http://www.medwastegroup.com/mainFSET-services.htm">www.medwastegroup.com/mainFSET-services.htm</a></td>
</tr>
<tr>
<td>RPR Environmental</td>
<td>(506) 667-5217 (905) 662-0062</td>
<td>All Ontario</td>
<td>√ √ unused only</td>
<td>√</td>
<td><a href="http://www.rpr-environmental.com/">www.rpr-environmental.com</a></td>
</tr>
<tr>
<td>Stericycle Inc.</td>
<td>(416) 644-3545 (416) 644-3544</td>
<td>All Ontario</td>
<td>√ Secure Chemical landfill √ Secure Chemical landfill √ Recycled</td>
<td>√ Incineration, secure chemical landfill Certified in Pharmaceutical</td>
<td><a href="http://www.stericycleink.com">www.stericycleink.com</a></td>
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</tbody>
</table>

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Appendix E

DENTAL AMALGAM SEPARATOR

How to choose a Dental Amalgam Separator
(Adapted from the Ontario Dental Association's newsletter dated October, 2003)

Choosing an appropriate dental amalgam separator can be a confusing and time-consuming process. The following questions should be used to obtain information from colleagues who have already installed amalgam separators and from dental amalgam separator manufacturers or suppliers. The answers to these questions should provide a good foundation for finding the right amalgam separator for you.

Ask a colleague:

- How long did it take to install – did you have to cancel/postpone patients or have it installed when your office was closed?
- What problems, if any, did you encounter in the installation process?
- Did you have to change any of your practice routines after it was installed?
- Has there been any impact on the suction?
- Has it proven to make a difference in the levels of dental amalgam waste and mercury waste entering the waste system?
- Has there been good follow-up service?

Key questions to ask the Amalgam Separator Supplier:

**Efficiency**

- What efficiency level is it certified to meet?
- Can verification of ISO 11143 certification or other proof of the efficiency level (95% or better) be provided?

**Practice Impact and compatibility**

- Will the separator unit affect the suction power or any other aspect of normal practice routines?
- What is the size of the unit?
- How many chairs will it serve?
- Does the unit service the waste from the cuspidor?
- Where in the office should the separator be located?
- Will the unit signal if it malfunctions?
- Does it accommodate wet and/or dry vacuum systems?

Accumulated Waste – Management and Disposal

- How will the accumulated dental amalgam waste be contained while in the office? It is recommended that the waste be contained in a sealed unit where vapours will not be emitted to the office. In addition, to reduce the risk of accidental spills, consider separator units with collection containers that don’t have to be emptied into another container before it can be transported from the dental office.
- Does the unit have a mechanism or signal to indicate that the container is nearly full and requires replacement? If not, how frequently will I need to monitor the unit? Who will pick up the waste? How much notice is required for pick up?
- What maintenance is required on the unit, and who is responsible for that maintenance (supplier or customer)?
- What does the service package include with respect to picking up the accumulated dental amalgam waste? How frequently is it collected?
- Will the manufacturer/supplier include the pick up and disposal/recycling of the accumulated amalgam waste? Ensure that the hauler is certified by the Ontario Ministry of the Environment (MOE) to pick up that particular class of waste (Refer to Appendix D for a list of certified haulers and the classes of waste they are certified to carry). Ask for a copy of the waste management company’s Certificate of Approval.
- How will the accumulated amalgam waste be disposed? Recycling is less harmful to the environment than incineration or disposal.
- Will the waste hauler also be able to pick up and dispose of the other types of hazardous wastes such as non-contact amalgam, silver, lead, and biomedical waste?
- What are the costs and/or purchase options?
- Are there installation costs?
- What are the payment options – are there options to lease or buy outright?
- Are costs of accumulated waste collection and disposal included?
- What is the policy on upgrading the separator as new technological advances are introduced?
### Dental Amalgam Separator Manufacturers and Suppliers as of April, 2005

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Product(s)</th>
<th>Technology</th>
<th>Certification</th>
<th>Efficiency</th>
<th>Tel #</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB Dental Trends Inc.</td>
<td>Rasch 890-4000, Dribisk 1000, Sedimentation, filtering, ion exchange</td>
<td>ISO</td>
<td>99.3% ISOtest</td>
<td>(800) 817-6704 (360) 354-4722</td>
<td><a href="http://www.amalgamseparation.com">www.amalgamseparation.com</a></td>
<td></td>
</tr>
<tr>
<td>Ash Temple</td>
<td>Distributes Maximum Separation Systems Inc 1000 and 601, Solmetex, Merc2 and AB Dental Trends Inc</td>
<td>ISO</td>
<td>99.82% ISOtest</td>
<td>(800) 268-6497 (905) 832-9101</td>
<td><a href="http://www.ashtemple.com">www.ashtemple.com</a></td>
<td></td>
</tr>
<tr>
<td>Biodent</td>
<td>Metasys Ecoll</td>
<td>ISO</td>
<td>97.6% ISOtest</td>
<td>(800) 211-1200 (450) 441-4800</td>
<td><a href="http://www.biodent.com">www.biodent.com</a></td>
<td></td>
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<tr>
<td>Bio Sym Medical Corporation</td>
<td>MERC II Separator System</td>
<td>ISO</td>
<td>95% ISOtest</td>
<td>(800) 947-7550</td>
<td></td>
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<tr>
<td>DRNA – Dental Recycling North America</td>
<td>BullfroHg10 Seperator, System Chair Side Traps (2 and 5 gal DRNA traps)</td>
<td>ISO</td>
<td>99% ISOtest</td>
<td>(800) 360-1001 (212) 956-5188</td>
<td><a href="http://www.drna.com">www.drna.com</a></td>
<td></td>
</tr>
<tr>
<td>Greenflow Environmental Services</td>
<td>Distributes Solmetex</td>
<td>ISO</td>
<td>99.82% ISOtest</td>
<td>(800) 287-5416 (905) 333-3004</td>
<td><a href="http://www.greenflow.com">www.greenflow.com</a></td>
<td></td>
</tr>
<tr>
<td>Henry Schein Arcona</td>
<td>Distributes Maximum Separation Systems Inc Solmetex and Hygenitek. Products: Amalgam Separation Unit, Amalgam Seperator Hg5</td>
<td>ISO</td>
<td>98.6 to 99.82% ISOtest</td>
<td>(800) 668-5558 (905) 646-1711</td>
<td><a href="http://www.hsa.com">www.hsa.com</a></td>
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</tbody>
</table>

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1. ISOtest refers to the ISO 11143 standard which determines efficiencies for particulate dental amalgam removal.
### Dental Amalgam Separator Manufacturers and Suppliers as of April, 2005

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Product(s)</th>
<th>Technology</th>
<th>Certification</th>
<th>Efficiency¹</th>
<th>Tel #</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hygenitek Inc.</strong></td>
<td>Amalgam Boss</td>
<td>Combination: sedimentation, filtration, ion exchange</td>
<td>ISO</td>
<td>99.3% ISOtest</td>
<td>(866) 494-3648</td>
<td><a href="http://www.hygenitek.com">www.hygenitek.com</a></td>
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<tr>
<td>Trepassey Industrial Park,</td>
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<tr>
<td>Trepassey, NL A0A 4B0</td>
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<tr>
<td><strong>Maximum Separation Systems Inc.</strong></td>
<td>MSS 1000 and MSS 601</td>
<td>Combination: sedimentation, filtration, ion exchange</td>
<td>ISO</td>
<td>1000: 98.6%, 601: 97.7% ISOtest</td>
<td>(800) 799-7147 (250) 642-1787</td>
<td><a href="http://www.amalgamseparators.com">www.amalgamseparators.com</a></td>
</tr>
<tr>
<td>6588 Sooke Rd.</td>
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<tr>
<td>Sooke, B.C. V0S 1N0</td>
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</tr>
<tr>
<td><strong>Patterson Dental Products</strong></td>
<td>Duplicates Hg5 Amalgam Separator, MSS 1000 and MSS 601, Solmetex</td>
<td>Refer to Manufacturer</td>
<td>ISO</td>
<td>98% to 99% ISOtest</td>
<td>(800) 268-0944 (905) 677-7711</td>
<td><a href="http://www.pattersondental.com">www.pattersondental.com</a></td>
</tr>
<tr>
<td>6300-A Viscount Road</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Mississauga, ON L4V 1H3</td>
<td></td>
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</tr>
<tr>
<td><strong>R &amp; D Services, Inc.</strong></td>
<td>Amalgam Collector</td>
<td>sedimentation</td>
<td>ISO</td>
<td>99.9% ISOtest</td>
<td>(800) 816-4995</td>
<td><a href="http://www.theamalgamcollector.com">www.theamalgamcollector.com</a></td>
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<tr>
<td>8120 Greenlake Drive North</td>
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<td>Edmonds, WA 98026</td>
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<td><strong>Sinclair Dental Co. Ltd.</strong></td>
<td>Solemetex Hg Separator</td>
<td>sedimentation</td>
<td>ISO</td>
<td>99.82% ISOtest</td>
<td>(800) 272-8205 (905) 238-2777</td>
<td><a href="http://www.sinclairedental.com">www.sinclairedental.com</a></td>
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<td>2785 Skymark</td>
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<td>Mississauga, ON L4W 4Y3</td>
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<td><strong>Solmetex</strong></td>
<td>Hg5, Hg5HV, Hg10</td>
<td>Hg5 and Hg5HV: sedimentation, filtration, ion exchange. Hg10 filtration, ion exchange</td>
<td>ISO</td>
<td>99%+ for Hg5 and Hg5HV ISOtest, Hg10 USEPA 245.1</td>
<td>(800) 216-5505 (508) 393-5115</td>
<td><a href="http://www.solmetex.com">www.solmetex.com</a></td>
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<td>50 Bearfoot Road, Suite 2</td>
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<td>Northborough, MA 01532</td>
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Inclusion in this list is not an endorsement for any company. Information on this list may change without notice. This list is for general information purposes only.

1. ISOtest refers to the ISO 11143 standard which determines efficiencies for particulate dental amalgam removal.