

IN THIS ISSUE

Dental Amalgam Separators	
Product Review	1
Expert Discussion	5
Desensitizing Agents	6
Product Review	6
Practitioner Input	7
Product Tips for Treating Hypersensitivity	9
Expert Discussion	10
Surface Disinfectants	11
Product Review	11
Lab Notes	11
Lab Tests	13
Practitioner Input	15
Your Views	16

THE BOTTOM LINE

David C. Sarrett, DMD, MS: *Editor*

Dental Amalgam Separators

Amalgam Collector CE24, Hg5, Hg5 HV, and CatchHg 1000 were the only products that dentists identified in our evaluation survey. As reported by its manufacturer, each unit in our review meets ISO standard No. 11143 for effective removal of amalgam particles (95 percent or better removal efficiency). Our survey of ACE Panel members shows that relatively few practitioners own an amalgam separator or plan to purchase one. Still, as this article will explain, it is important for dentists to start learning about the key issues related to this technology before they purchase an amalgam separator.

Desensitizing Agents

Based on our survey results, more dentists used Gluma Desensitizer and Duraphat than other products (n=120 to 249 versus n=15 to 45). Microprime B, notable for its acceptance among patients, was rated as the best overall product; however, overall, a low number of dentists rated this product. In terms of performance, Vanish 5% NaF was the second highest-rated product.

Surface Disinfectants

According to the Centers for Disease Control and Infection noncritical surfaces visibly contaminated with blood, saliva or other potentially infectious material should be disinfected with an intermediate-level germicide that claims tuberculocidal activity. Ten intermediate-level disinfectants, including a household bleach, were tested. Two of these products failed to meet the performance standard as set by the Environmental Protection Agency for tuberculocidal activity. When shopping for surface disinfectants, be sure to scrutinize their label ingredients to avoid confusion; some products are remarkably similar in packaging, but offer significantly different active ingredients.

DENTAL AMALGAM SEPARATORS

Product Review

In this review, we'll discuss the issues that you should consider when shopping for an amalgam separator. The type of amalgam separator that's right for your practice depends on factors such as the plumbing *continued on next page*

AmalgamBOSS, LibertyBOSS

M.A.R.S. Bio-Med Processes, Inc.
(866) 594-3648
www.marsbiomed.com

Amalgam Collector Model CE24

R&D Services, Inc.
(800) 816-4995
www.TheAmalgamCollector.com

Amalgam Separators BU10, BU30, MRU10

Dental Recycling North America, Inc.
(DRNA)
(800) 360-1001
www.drna.com

ASDEX System, AS-9

Capsule Technologies
(952) 933-4147
www.capttech.biz

CatchHg 1000

(formerly RME 1000)
Rebec Simple Solutions
(800) 569-1088
www.rebecsolutions.com

Guardian Amalgam Collector

Air Techniques, Inc.
(800) 822-2899
www.airtechniques.com

Hg5-Mini, Hg5, Hg5 HV

Solmetex
(800) 216-5505
www.solometex.com

Purevac Hg

Sultan Healthcare
(800) 637-8582
www.sultanhealthcare.com

Pure Water ECO II

Pure Water Development, LLC
(877) 638-2797
www.ecotwo.com

Serfilco 0.5/1.0

Serfilco, Ltd.
(800) 323-5431
www.serfilco.com

Rasch 890-1000

Wet Pump Outlet System

Rasch 890-1500 In-line System

Rasch 890-4000 Micro-Cleanse Scrubber Upgrade Kit

Rasch 890-6000 Dry Pump Outlet System

Rasch 890-7000 Portable System
AB Dental Trends, Inc.
(800) 817-6704
www.amalgamseparation.com

Editor: David C. Sarrett,
DMD, MS
ppreditor@ada.org



American Dental Association
www.ada.org

211 East Chicago Avenue
Chicago, Illinois 60611-2678

configuration of the office, the physical space required for installation, monitoring and maintenance issues, legal requirements (if any) for the types of separators required, as well as proper disposal practices for collected amalgam waste.¹ In addition, you'll have to consider costs like the unit purchase price and expenses associated with its installation, maintenance and waste disposal requirements.¹

Why This Product Category Matters to You

For dentists who place or remove amalgams, the trend requiring them to install amalgam separators continues. Presently, eight states require separators by law or regulation. These are the six New England states, plus New York and Oregon. Similar legislation has been filed or is pending in several other states. Several cities require dentists to install separators—among them, Seattle, Milwaukee and San Francisco. The local wastewater treatment authority in Green Bay, Wisc., has received a \$50,000 grant from the state's department of natural resources to reimburse dentists who voluntarily purchase and install separators.²

Each unit in this review removes 95 percent or more of amalgam particles (as reported by the product's manufacturer), which meets and/or exceeds the minimum level established by the International Organization for Standardization (ISO).³ We'll provide you with the pertinent information you'll need to make an informed purchase decision.

We also invited three experts to provide product suggestions and recommendations. You can “listen in” on the experts by reading the **Panel Discussion** and learn what these experts had to say on the issues that affect you.

Amalgam Separator Types

There are different types of amalgam separators based on the method of action: sedimentation, filtration, centrifugation, chemical removal by ion exchange or a combination of these methods.

Sedimentation units. These separators reduce the speed of wastewater flow, which allows amalgam particles to settle out of the wastewater.

Filtration units. Depending on the type of filter used, these separators remove not only coarser amalgam particles but also some finer and colloidal amalgam particles.

Centrifuge units. These products use centrifugal force to draw out amalgam particles from the wastewater.

Combination units. These separators use any combination of two or more technologies to remove minute amalgam particles and dissolved mercury particles.

Consider the Issues

Before you install an amalgam separator, you'll need to consider some issues (Box 1).

Box 1. Amalgam Separator Buyer's Checklist.

	FACTOR	COMMENTS
Office Considerations	Operatories (number of chairs)	Offices with four or more chairs should consider central, not chairside, units
	Number of amalgam restorations placed or removed per day	Offices that perform more than 40 amalgam-related activities per week* may need a unit with a large storage capacity
	Office operations (number of days per week)	
	Dental practices located in your building Number and type	Consider combining similar flows with other offices if possible to share or reduce costs
	Do you own or lease your space? Would lease stipulations affect installation of a separator? What terms are included for utilities maintenance?	Confirm that plumbing system modifications are consistent with lease provisions
	Do you operate wet/dry cuspidors?	Wet cuspidors should be plumbed to a separate line if possible (and if permissible under applicable law); if not, separator should have a holding or surge tank with sufficient capacity
Building Configuration	Is sufficient space available to the air/water separator drain-line and sewer-line connection?	Certain separators rely on gravity flow and require adequate space from the air/water separator line to connect to the drain system
	Access to electrical power (voltage)	Check the power supply needs for each model under consideration
	Size and material of existing sewer connection	Separator installation should not constrict existing vacuum or drain-line requirements
Vacuum System	Do you operate a wet or dry vacuum system?	Wet-ring vacuum pumps generate additional water flow that will require greater storage capacity
	Will any warranty be affected by third-party installations?	Some warranties may be invalidated if parts of the system are modified by third parties
	Is the vacuum system dedicated to your office?	Group practices that share vacuum systems may want to replumb or split costs associated with amalgam separator
	Location of the vacuum system Basement or office?	Office-level systems may require smaller units. Vacuum systems should be vented to outside air.
	Space available adjacent to vacuum system (height, length and width)	Access to upstream piping is critical for maintenance and inspection of systems
Separator Specifications	Recommended installation location Capacity (in chairs) Maximum flow rate Life-cycle cost	Evaluate model information against the specific conditions for the practice (such as space, plumbing, access, workload, regulatory considerations)
Other Considerations	In your group practice, who is responsible for Equipment servicing and maintenance? Water/sewage/utilities? Amalgam collection/recycling?	Group practices that share vacuum lines may need to discuss how the addition of an amalgam separator will affect allocation of cost and responsibilities, as well as make arrangements for access to the unit

* Source: Kidd K, Cameron M, Peters J. Recommendations for controlling mercury and dental wastes. Tufts University Graduate Program Capstone study conducted for Massachusetts Water Resources Authority, 1998. Adapted from McManus KR, Fan PL. Purchasing, installing and operating dental amalgam separators: practical issues. JADA 2003;134(8):1054-65. Copyright © 2003 American Dental Association. All rights reserved. Adapted 2007 by permission.

Prepurchase Considerations

Installation Location. Generally, amalgam separators are installed within the vacuum system piping (in-line) at or near individual operatory chairs; in-line at a central location upstream of the vacuum pump; or at the outlet side of the air/water separator.¹ According to manufacturer recommendations, the units listed in Table 1 should be centrally installed, except the Serfilco (Serfilco, Ltd.) and ASDEX System AS-9 (Capsule Technologies) products. The Rasch 6000 and 7000 are compatible with dry systems only. All other units work with both wet or dry vacuum systems.

Reader Tip: Install the amalgam separator as near as possible to the vacuum pump to minimize the effect on vacuum pressure. The addition of a hose to an existing vacuum piping system generally means more bends or angles in the length of that hose, which can compromise vacuum. Also, the addition of more than four feet of new hose can weaken vacuum performance.

Building and Office Configuration. If your office building has a basement level, consider putting your amalgam separator there. It's likely where you've installed the vacuum systems and air/water separators, anyway. The basement location not only will conserve valuable office space, but also will provide enough space upstream of the vacuum system to collect flow. Alternatively, if you don't have a basement, space upstream will be limited if your existing systems are installed behind a closet and/or cabinet doors or in utility spaces. As a result, you may have to install chairside amalgam separators.

Monitoring, Ease of Maintenance and Associated Costs

It can happen—you're in the middle of a dental procedure and suddenly the vacuum s-l-o-w-l-y loses power because the canister in the basement has become full. To avoid practice interruptions like this from happening, understand the maintenance requirements and schedules of your separator *before you buy any unit*.

Collected amalgam has to be removed from every unit; but what varies is how and when. Some separators will need to be decanted daily; others will require that you replace or recycle the entire unit or canister every three to 18 months, depending on your practice volume. The needs, capacities and constraints of your practice will determine the separator that's right for you.

Reader Tip: Before you purchase any unit, determine who will be responsible for monitoring and maintaining your amalgam separator—you, someone from your office, or a vendor technician. Well-meaning practitioners often will assume the tasks of monitoring and maintaining the unit to avoid paying for the services of an outside technician. But in some cases, this arrangement can become problematic and, in the long run, cost you money instead. To aid monitoring, some units have an audio alarm to signal when the container should be replaced or recycled, as well as to indicate operation malfunction. Other units have transparent collector housing units to aid visual identification.

The expert panel (see **Panel Discussion**) agreed that the right package for you should include a thorough understanding of monitoring and maintenance services, whether your office staff or a vendor technician performs them.

There's More on PPR Online

For a detailed look at survey responses about these products, visit PPR online at "www.ada.org/goto/ppr".

Clean Your System Regularly

Keep an eye out (and ear, too) for warning signs such as loss of suction power or increased mechanical noise from the vacuum pump; either may suggest that clogs have developed in the line, which can occur over time with use.

Limiting the biological growth within the system will keep things humming along nicely. Your vendor's recommendations will depend on the amount of biological material introduced into the system, the length of vacuum lines, and the type of separator.

Reader Tip: Do not use bleach or other chlorine-containing solutions to clean the lines. They can remobilize bound mercury and release it into the waste stream, thereby compromising the efficacy of your separator.

Remember to consider the cost of replacement parts when budgeting for your system. Ask your vendor about how often you'll have to replace the unit. Again, this will partly depend on your patient load and the number of amalgam restorations performed. The vendor can estimate these figures, but your practice has its own particular set of factors that should be considered when predicting the cost of a system. With some units, especially with sedimentation separators, the entire product is replaced instead of any cartridge. Check with your supplier to determine replacement costs for your separator.

Warning Signal Feature. Remember that dreaded scenario, losing vacuum power because the container has reached maximum capacity? To minimize that prospect, consider a product with an early warning signal feature that indicates when its container needs to be changed or the unit is malfunctioning. Ask the manufacturer if the warning feature is visual, audible, or both, and where it is located so it can be easily detected. Also, find out when the alarm will activate in advance of the unit actually becoming full. Our panel experts suggest an appropriate lead time of about three to four days, which should allow routine maintenance that won't interrupt your practice.

Regulatory Issues

The effort to reduce amalgam waste discharge from the dental office often is the result of increasing pressure facing local wastewater treatment plants to reduce the concentration of mercury in effluent from their plants and the concentration of mercury in sludge. Although there is no national regulation requiring the installation of amalgam separators in U.S. dental offices, state and local requirements exist in some areas. Currently, eight states and a number of localities lawfully require dentists to install amalgam separators. Where mandatory controls do exist, the requirement generally applies to dentists who place or remove amalgams. Check with your state or local dental society to see if any requirements exist in your area.

To ensure proper disposal of amalgam waste, you should contract with a vendor-sponsored program or make disposal arrangements with an independent recycler.

Many amalgam separator manufacturers offer recycling programs as part of their sales package, which generally allows spent or full cartridges/separators to be shipped to recycling facilities for a service fee or as part of a lease. Ask your vendor about the available recycling services in your area (Box 2).

Table 1. Summary Comparison of Product Features and Cost

Brand Name and Manufacturer	Unit Cost/ Maintenance Cost	Chairs Served	Intervention Warning	Maintenance
AmalgamBOSS LibertyBOSS M.A.R.S. Bio-Med Processes, Inc.	\$899	1-10	Alarm - container	Technician
	\$1549	4-20	Alarm - container	Technician
Amalgam Collector, CE24* R&D Services, Inc.	\$1245 for manual \$1620 for automatic recycle container \$150	1-12	Visual - container	Reusable canisters Manual - daily
Amalgam Separator BU10 Dental Recycling North America (DRNA)	\$750	1-6	No	Technician
Amalgam Separator BU30 DRNA	\$1395	7-12	No	Technician
Amalgam Separator MRU10 DRNA	\$1500	1-6	No	Technician
ASDEX System, AS-9 Capsule Technologies	\$229 \$79 filter	1	Yes	Replace filter
ECO II Pure Water Pure Water Development, LLC METASYS GROUP	\$335	1-6	Yes	Replace when full
Guardian Amalgam Collector Air Techniques, Inc.	\$1725 - \$3615 \$850 collector replacement kit	1-7	No	Evac cleaning, replace collection container
Hg5-Mini SolmeteX	\$750 \$170 filter	1-4	Visual	Change cartridge
Hg5[†] SolmeteX	\$750 \$170 filter	1-10	Visual	Change cartridge
Hg5 HV[§] SolmeteX	\$2500 \$170 filter Filter cartridge with recycle kit \$285	1-20	Visual	Change cartridge
Purevac Hg Sultan Healthcare	\$1080	1-6	No	Recycle, daily line cleaning
Rasch 890-1000 Wet Pump AB Dental Trends, Inc.	\$1190 replace canister \$596	1-12, 24 with upgrade kit	Alarm - optional	Replace canister, flush daily
Rasch 890-1500 Inline System AB Dental Trends, Inc.	\$695, replace canister \$596	1-12, 24 with upgrade kit	Alarm - optional	Replace canister, flush daily
Rasch 890-4000, Micro-Cleanse Scrubber Upgrade Kit (not a total system) AB Dental Trends, Inc.	\$718, upgrades the 890-1000 or 890-1500, which must be purchased separately \$596, replace scrubber canister every 144 doctor months	24 when used as an upgrade kit	See 890-1000, 890-1500 product information	Flush daily
Rasch 890-6000 Dry Pump AB Dental Trends, Inc.	\$666, replace canister \$597	12-256	Alarm - optional	Replace canister, flush daily
Rasch 890-7000 Dry Pump AB Dental Trends, Inc.	\$1076 replace canister \$596	1-2	Visual	Replace canister, flush daily
CatchHG 1000 (formerly RME 1000) Rebec Simple Solutions	\$1665 replace container \$445	1-10	No	Return container for processing
Serfilco 0.5/1.0 SERFILCO, Ltd	\$354 filters \$1.78-\$2.26	1	Visual	Replace filter

* Rated by 20 PPR dentists

† Rated by 10 PPR dentists

§ Rated by 71 PPR dentists

|| Rated by 18 PPR dentists

Amalgam Collection/Recycling: Best Management Practices.

It is sometimes difficult to categorize whether state or local legislative/regulatory action concerning installation of separators or adherence to Best Management Practices (BMPs) is mandatory or voluntary. Note that in a few areas, best management practices include amalgam separators. The ADA's BMPs and many other BMPs do not include amalgam separators. The ADA strongly urges dentists to follow BMPs.

Dental Waste Amalgam Online Information Resources

For more information on amalgam waste issues, including the ADA's Best Management Practices, visit http://www.ada.org/prof/resources/topics/amalgam_bmp.asp#amalgam.

For more information on amalgam waste issues, visit <http://www.ada.org/prof/resources/topics/amalgam.asp>

For more information on local requirements that may exist in your area, visit your state or local dental society at <http://www.ada.org/ada/organizations/index.asp>

Should your office assume the responsibility of the amalgam collection/recycling process, this means you will have to perform one or more of the following collection and recycling tasks:

- disposal of the collected amalgam waste;
- disposal of the used canisters or used filter cartridges;
- disposal of the used filter cartridge and/or resin cartridge, along with the collected waste.

Or, you can contact a vendor to handle these procedures. Alternatively, the manufacturer of your amalgam separator may offer amalgam waste handling/recycling services as part of the unit's purchase or lease cost. *Before you buy*, ask the manufacturer exactly what types of recycling services are included in the cost (Box 2). For a directory of amalgam recyclers, visit ADA.org at http://www.ada.org/prof/resources/topics/topics_amalrecyclers.pdf.

Reader Tip: For specific information about amalgam collection recycling services for these products, visit PPR online at "www.ada.org/goto/ppr".

Box 2. Questions to Ask About Amalgam Recycling.* †

- What kind of amalgam waste do you accept?
- Do your services include pickup of amalgam waste from dental offices? If not, can amalgam waste be shipped to you?
- Do you provide packaging for storage, pickup or shipping of amalgam waste?
- If packaging is not provided, how should the waste be packaged?
- What types of waste can be packaged together?
- Do you accept whole filters from the vacuum pump for recycling?
- Is disinfection required for amalgam waste?
- How much do your services cost?
- Do you pay for clean non-contact amalgam (scrap)?
- Do you accept extracted teeth with amalgam restorations?
- Does your company have an EPA or applicable state license?
- Does the company use the proper forms required by the EPA and state agencies?
- Do your procedures comply with ANSI/ADA Specification 109: Procedures for Storing Dental Amalgam Waste and Requirements for Amalgam Waste Storage/shipment containers?‡

* Source: American Dental Association. ADA best management practices for amalgam waste. Available at: "www.ada.org/prof/prac/issues/topics/amalgam.html#BMP".

† Because the generator of the waste is responsible for proper disposal, dentists should obtain replies to these questions in writing from their recyclers.

‡ American Dental Association Council on Scientific Affairs. American National Standard/American Dental Association Specification No. 109. Procedures for storing dental amalgam waste and requirements for amalgam waste storage/shipment containers, 2006

For the Practitioner Input and Web-based survey, visit the PPR online at "www.ada.org/goto/ppr".

References

- 1 McManus KR, Fan PL. Purchasing, installing and operating dental amalgam separators. JADA 2003; 134:1054-1065.
- 2 American Dental Association, Department of State Government Affairs.
- 3 International Organization for Standardization. ISO No. 11143-1999(E). Dental equipment—amalgam separators. Geneva, Switzerland: ISO.

DENTISTS, INDUSTRY EXPERTS DISCUSS AMALGAM SEPARATORS

Moderator: Frederick Eichmiller, DDS
Vice President and Dental Director
Delta Dental of Wisconsin
Mosinee, WI

Participants: Kevin McManus, MA, MBA
Senior Program Director
EBI Consulting
Boston, MA

Tim Tuominen, BS
Chemist
Western Lake Superior Sanitary District
Duluth, MN

Connie Verhagen, DDS
Pediatric Dentist
Muskegon, MI

Eichmiller: What do you see as the chief complaints/problems encountered with today's separator technologies or instruments?

McManus: The thing that I hear a lot is the difference in performance in the field than what was either promised or represented by the vendors, and I think the reason for that is that installation in clinical situations is always going to be very site specific. For example, there are often times when people will say, "I thought this cartridge was supposed to last for 6 months or 9 months or a year, and I've had to swap it out three times already, what's going on there?" And I think it's still early to say whether or not it's common to all these, but I think it has to do with the fact that offices may be collecting a lot of other material, which is degrading the performance and longevity of the units, particularly the cartridge type units.

Eichmiller: Well, that's a capacity issue, really. Things like prophylaxis paste will load up a separator very quickly, so a lot of times, you're

right, it's installation specific. So if you have an office that has hygiene chairs connected in with the restorative chairs, they're going to fill up a separator much more rapidly than if they're isolated just to the units that are doing the amalgam work.

Verhagen: When you start talking to dentists about putting in an amalgam separator, you get a lot of questions: How big is this unit going to be? Will it fit in my office? What will it cost? Who's going to install it? Are there plumbing codes involved with the installation? As far as maintenance, someone has to either physically operate or simply visually inspect the separator, sometimes daily, sometimes weekly and sometimes monthly. It is not something that you can just put in place and then forget about it. You want to make sure it is working properly. The separator is another maintenance item that affects your equipment performance. You could be in the middle of an operative procedure when suddenly the vacuum goes out, and then you remember that you have an amalgam separator that you have to take care of.

McManus: So lack of a warning signal or something to let you know that it's reaching capacity?

Verhagen: Right. And when it reaches capacity, *everybody* stops working. Everything just comes to a halt.

Eichmiller: **Do you think the solution is a better warning system?**

Verhagen: Absolutely, we can not just rely on visual inspection.

Eichmiller: Because that is something that was brought up at the ISO level, more than once. The warning systems we have now are mainly visual, and so you have to have someone checking that level all the time, and there really aren't many with audible alarms connected to them. Also those warning systems might be off in the back room somewhere, rather than in the treatment setting or in a place where you normally would see it.

McManus: One additional comment that is not strictly technology, but deals with the total package provided to a dental office is that typically maintenance falls to the hygienist or an assistant – to order

the cartridges, swap them out and understand enough about them. I get a lot of calls from people asking us to provide routine maintenance. It seems to me that an important enhancement would be to provide a total package that really takes the right people through regular maintenance in a way that makes sure that services aren't interrupted. I find that sometimes this information doesn't get effectively communicated to the person who is responsible for maintaining the units.

Verhagen: Another important feature is to provide an easy way to dispose of the collected amalgam. Many companies that provide a canister system also provide an easy way to swap canisters and a mailing container for sending the full canister in for recycling.

Tuominen: I think they'll work with you, not all of them do it themselves, but they'll work with you to have a place to send it.

McManus: A couple units still require you to decant the material off, and that is less preferable, I would guess, for most offices. Most newer units swap out the entire unit and I think those have some real desirable features if, again, people understand when and how to swap the units out.

Eichmiller: **What do you think is the largest obstacle to the acceptance and use of separators today?**

Tuominen: I've dealt with every dentist here in Duluth, and I think the biggest thing that happened with us is that a few dentists tried them and said, "I can run my practice with this and it's not causing any problems." The fear of the unknown was the biggest obstacle. Dentists were worried about whether they could still practice with these things.

Eichmiller: **Do you feel the same was true on the maintenance side?**

Tuominen: I worked with a group of dentists that acted as a leadership group. When we were getting down to where we had one or two dentists to go they said, "Give us their phone numbers and we'll visit with them and tell them it's no big deal." And that's how we worked

For the full discussion, visit the PPR online at "www.ada.org/goto/ppr."