

Bleach-Free Vacuum Line Cleaners With Minimal Mercury Release¹

Dental practices routinely use special cleaning products to maintain their vacuum systems. Cleaners that contain enzymes, detergents, or mild organic solvents are able to effectively remove accumulated debris in the vacuum lines. Typically this cleansing is done daily or weekly.

However, there are two issues that a dental practice needs to consider when choosing a cleaner for its vacuum lines.

1. **Avoid bleach or other chlorine-containing ingredients:** The product should not contain bleach (sodium hypochlorite) or other chlorine based ingredients such as dichloroisocyanate. Products with chlorine and other oxidizing ingredients tend to dissolve amalgam particles in the vacuum line, thereby releasing mercury into the sewer system.² For this reason, many sewer agencies prohibit the use of oxidizing vacuum line cleaners.
2. **Consider the pH:** The line cleaning product should have a pH that does not invalidate the warranty of the vacuum pump or amalgam separator manufacturer. For example, Solmetex requires that the pH of line cleaners be in the range of 6 to 10, and has published a list of line cleaners that meet its approval.³ Rebec's warranty indicates that users of its equipment should pick a non-acidic line cleaner.⁴ In addition, each dental practice needs to be aware of pH limitations that its local sewer agency may have for all commercial dischargers.

Dental practices should review the material safety data sheet (MSDS) for each line cleaner being considered for use to determine its ingredients and pH. It may be necessary to also call the manufacturer's customer service desk.

¹ Prepared by Thomas Barron, P.E. and Stephanie Hughes, P.E. for the Bay Area Clean Water Agencies (BACWA), November 2, 2009

² Batchu, H. et al., "The effect of disinfectants and line cleaners on the release of mercury from amalgam", Journal American Dental Association, Vol 137, 2006. This article is available at: <http://jada.ada.org/cgi/content/full/137/10/1419e>.

³ As of November 2, 2009, the most recent list published on the [Solmetex web site](#) was dated March 12, 2009, and that list is appended to this document.

⁴ <http://www.rebecsolutions.com/warranty.html>

Vacuum Line Cleaning Solution pH and Hg5® Performance

According to the American Dental Association (ADA) and regulators requiring Amalgam Separators, oxidizing line cleaners should not be used. Oxidizing cleaners can breakdown amalgam particles. Cleaners containing bleach (chlorine bleach, sodium hypochlorite) should never be used as chlorine is known to cause mercury to be released from amalgam.

Regulators have also become aware of pH related to line cleaners. Sewage treatment plants require discharges from their users to be between 5.5 and 10 on a pH scale. Some new amalgam separator regulations now require the use of line cleaners with neutral pH. Acidic (low pH) line cleaners have been known to hinder the operation of Amalgam Separators. Basic (high pH) cleaners can cause premature wear on materials used in amalgam separators

Recommendations:

SolmeteX recommends the use of vacuum line cleaners that have a pH between 6 and 10. There are several cleaners with a pH near neutral (pH 7). Most of these rely on enzymatic processes. Below is a list of readily available cleaners that have pH ranges most compatible with the Hg5®. If the line cleaner you are currently using is not on the list feel free to contact SolmeteX for further information.

NAME	MANUFACTURER	pH (a, b)	
PureVac HG	Sultan	8	Recommended
BioVac	Micrylium	8.5	Approved
BLAST	Preferred Dist., Inc.	7-9	Approved
Citrizyme	Pascal Company	7.7	Approved
CleanStream	Air Techniques	8.8	Approved
EmPower	Metrex	6.5 to 8.6	Approved
Enzymax	Hu-Friedy	7	Approved
FRESH-VAC	Ecolab, Inc/Huntington	6.5 to 8.0	Approved
Maxizyme	Henry Schein	6.5-8.6	Approved
Medical Enzyme Detergent	Enzyme Solutions	6.8 – 7.4	Approved
Microvac	Microbex	8.6	Approved
Neutravac	Biotrol	7.0-8.0	Approved
Perfection Plus	Perfection Plus Group	7	Approved
ProEZ	Cetrol International	7	Approved
Quala	Enzyme Industries	7.3 – 9.0	Approved
Sani-Soak Ultra	Enzyme Industries	8	Approved
SlugBuster	RAMVAC	8.5	Approved
Super Vac 40 Plus	EPR Industries	7-7.5	Approved
VacuCleanse Evacuation	Infection Control Tech	7.7	Approved

a) The pH data is taken from manufacturer MSDS, communication with the manufacturer or measurement by SolmeteX.

b) The Massachusetts Department of Environmental Protection requires the use of line cleaners with pH between 6.5 and 9.