

Questions About Laboratory

Dental Laboratory

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Precious Metals Storage (12/09)

Question: The tumbler mechanism on our present safe has become unreliable and it has been determined to be too old to repair. What are the current requirements we need to consider when purchasing a new safe?

Answer: All safe requirements are guided by AFI 31-101* (Integrated Defense) which is overseen by your local base Precious Metals Recovery Manager. AFI 31-101 was significantly revised in October 2009 and a complete review of the document is recommended. Previously approved storage containers currently in use may continue to be used in most cases, but DECS recommends having your installation Precious Metals Recovery Program Manager and security forces Resource Protection Manager evaluate specific safe requirements for you. (References: AFI 31-101 Integrated Defense, paragraph 8.4.4.10-8.4.4.11, AFMAN 23-110 volume 6, chapter 4, paragraph 4.16, and DoD 5200.08-R, chapter 7). Information about safes on the GSA contract can be found by visiting: <http://www.gsacontainer.com/> or <http://www.fedlock.com/>.



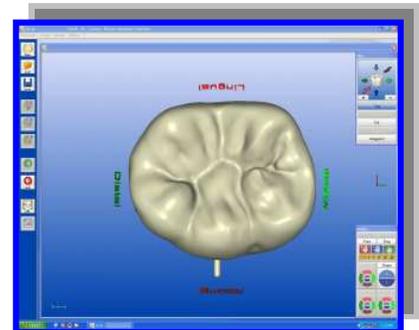
*Note: AFI 31-101 is For Official Use Only (FOUO) and is only available to Common Access Card (CAC) users at <https://afsmil.lackland.af.mil/>.

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Electronic CAD/CAM* Submission (10/09)

Question: What are the procedures for submitting CAD/CAM files to the ADL?

Answer: The Petersen Area Dental Laboratory (ADL) has posted CAD/CAM e-mail submission procedures on their Web site addressing this issue. [Click here](#) for a copy of the instructions. This document and other submission standards are available and updated periodically on the [ADL Web site](#) which can be accessed through the [Air Force Portal](#).



*CAD – Computer-Aided Design
CAM – Computer-Aided Manufacturing

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Dental Lathes and Safety (11/07) (originally published 9/01)

Question: During a recent Dental Laboratory Safety inspection, we were told that our bench lathes need to be anchored to the bench tops. In the past, this hasn't been an issue. Do lathes have to be bolted down?

Answer: The reason that some people believe dental lathes must be anchored to a bench or counter top is because of an Occupational Safety and Health Administration (OSHA) regulation (29 CFR 1910.212). The regulation covers various types of machinery and one portion of it states that "Machines designed for a fixed location shall be securely anchored to prevent walking or moving." However, OSHA issued an interpretation and compliance letter on 4 Sep 1996 specifically addressing whether or not dental lathes must be anchored down. The letter noted that they do not. OSHA felt it important that dental lathes remain portable for easy relocation to different work areas or storage locations in the laboratory. OSHA also noted that the lathes are fitted with rubber feet that prevent the lathes from moving or walking across the bench top when in use.



It seems clear then that lathes in the dental laboratory do not need to be anchored to a bench or counter top. Nothing prevents you from doing so, but no OSHA requirement exists mandating it. To view the OSHA Interpretation Letter, click [here](#).

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Portable Gold Vacuums (10/07)

Question: I have not been able to find a replacement filter bag for our Jelenko Scrap Master ("Gold Finder") portable gold vacuum. Do you have any information on where I can find a source for either a replacement filter bag or a new portable gold vacuum?

Answer: Jelenko Corporation has discontinued the Jelenko Scrap Master portable gold vacuum and filter bags. After researching replacement products, DECS found that the replacement filter bags for the Jelenko Scrap Master can be obtained by contacting the Defense Reutilization and Marketing Service (DRMS) Precious Metals branch at (269) 961-7071 Commercial, 661-7071 DSN, or www.drms.dla.mil/precmet/contacts.htm. Regarding the portable gold vacuum, DECS was able to find only one suitable replacement—the 1.5 HP Hippo Portable Hand-Held Vac which is available for \$109.00 (suggested retail). Additional information about the vacuum is available by contacting R. E. Williams at (888) 845-6597, (661) 775-5979, (661) 457-3835 FAX, or info@rewci.com.



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The New Low-Fusing Porcelains (12/03)

Question: What's the difference between low-fusing and high-fusing porcelain?

Answer: The difference between low- and high-fusing porcelains is the firing temperature used to fuse the glass. A few years ago there were three classifications of porcelain: high-, medium-, and low-fusing. Now we refer to porcelain using only the terms high- and low-fusing. However, the low-fusing porcelain used a few years ago is considered high-fusing today. We now have a whole new category of low-fusing porcelain.¹ Today's low-fusing porcelain was developed to be less abrasive to opposing dentition by incorporating finer leucite crystals in lower concentrations. However, recent



laboratory studies are equivocal, with some showing a reduction in enamel wear and others showing no difference.²⁻⁵

Potential advantages to low- and high-fusing porcelain are:

Low-fusing porcelain:

- Laminate veneers may be corrected without investing in a refractory material.
- Less chance of alloy distortion due to the lower firing temperatures.⁶
- Less wear on porcelain ovens.
- Reportedly easier to polish.

High-fusing porcelain:⁶

- Superior strength.
- Superior translucency.
- Maintains form better during repeated firings.

Clinical studies are necessary to evaluate the potential reduction in wear of opposing dentition by today's low-fusing porcelains.

References

1. Anusavice KJ. Dental Porcelains. In: Anusavice KJ, eds. Phillips' Science of Dental Materials, 10th ed. Philadelphia: W.B. Saunders, 1996:588
2. Clelland NL, Agarwala V, Knobloch LA, Seghi RR. Relative wear of enamel opposing low-fusing dental porcelain. J Prosthodont 2003;12:168-175.
3. Imai Y, Suzuki S, Fukushima S. Enamel wear of modified porcelains. Am J Dent 2000;13:315-323.
4. Latta MA, Sheets JL, and Simister B. In-vitro wear assessment of feldspathic and low-fusing porcelain vs. enamel. J Dent Res 2002;abstr #1940.
5. al-Hiyasat AS, Saunders WP, Sharkey SW, Smith GM, Gilmour WH. Investigation of human enamel wear against four dental ceramics and gold. J Dent 1998;26:487-495.
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Flask- and Monomer-Free Dentures (Originally published in May 2003)

Question: Recently I saw an advertisement for a new denture resin system called Eclipse. It is reported to be flask-free and monomer-free. Is this a viable alternative to our traditional compression molded method of processing denture bases?

Answer: Eclipse prosthetic resin system is a new method of fabricating dentures from Dentsply International. It is being marketed as an indirect build-up method for fabricating dentures that is monomer-free and flask-free. Eclipse is a light-cured system that does not contain any ethyl-, methyl-, butyl-, or propyl-methacrylate monomers. Let me begin by briefly explaining how the Eclipse system works.

The system uses three different types of light-cured resins to build a denture. First, a baseplate resin material is adapted over the master cast and light-cured in the processing unit. After curing, the master cast may need to be destroyed, as it is not blocked out prior to adapting the baseplate material. If the master cast is destroyed, a working cast must then be made using the processed baseplate. This processed baseplate is going to be part of the final denture and provides final denture fit during the occlusal registration and try-in appointments. A traditional wax rim can now be adapted to the baseplate and used for the occlusal registration appointment. At this time the dentist also evaluates the fit of the processed baseplate. The completed occlusal registration is now articulated with the working cast. After articulation, all wax must be removed from the baseplate to enable the set-up resin to properly bond with the baseplate resin. A small amount of the set-up resin is used to hold the teeth in place during set-up procedures. But before teeth can be set, mechanical retention must be made in each tooth to achieve

bonding with the resin, as Eclipse does not form a chemical bond with denture teeth. After the set-up is complete, a contour resin is applied to form the completed contours of the denture base. The contour resin is first melted in a warming pot then applied with an electric spatula. A traditional try-in can now be accomplished. The dentist reportedly can make small changes to the set-up by placing the denture in warm water, then gently moving the teeth into the desired position. Extensive changes may need to be accomplished by the dental lab. After the try-in, final contouring of the denture base is completed, followed by polymerization in the Eclipse processing unit, then final polishing. Eclipse is also reported by the manufacturer to work well for processing RPD bases and nightguards.

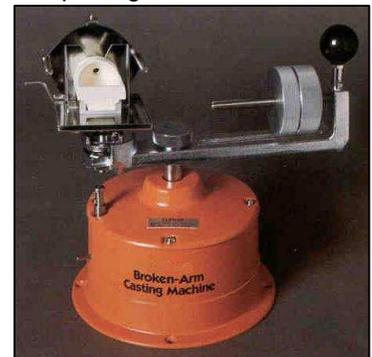
Eclipse is purported by Dentsply to meet or exceed ISO specification 1567 for color stability, tooth retention, sorption, solubility, and flexural properties. Eclipse eliminates flasking and the use of monomer, and reduces the use of wax during the set-up. It is also said to be reliable and repairable like conventional denture base materials. However, Eclipse does seem to make the use of an occlusion rim as a guide for tooth set-up more difficult. When using a traditional contoured occlusion rim you would first need to set the teeth in the maxillary wax rim using the labial contour, cuspid lines, and midline as guides for tooth placement. Next, a matrix would be need to be made to preserve the placement of this set-up. Then the teeth and wax must be removed from the processed baseplate. Now the teeth can be reset on the clean baseplate using the matrix along with set-up resin and contour resin. Additionally, although the manufacturer states tooth retention requirements are met by incorporating mechanical retention, this could be a problem area.

As you can see, Eclipse is different from our traditional compression-molded way of making dentures. Whether it is faster and lowers cost is still not known. Eclipse has a start-up government cost of \$11,055.00. Additionally, a two-day training course must be attended before a system can be purchased. The course costs \$600.00, which is deducted from the cost of the system if it is purchased at the time the course is attended. Because this is a new system on the market I would suggest gathering all the information possible on how it would work for your particular laboratory environment. Additional information can be obtained by visiting the Dentsply website at: www.trubyte.dentsply.com.

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61-04 Dental Lab Casting Machine Lids (12/00)

At DIS we occasionally receive calls asking about the need to either provide a lid for traditional laboratory casting machines or to purchase an alternative design. A review of the history of this issue will help provide an answer. In May of 1994, a Michigan Occupational Safety and Health Administration (MIOSHA) inspection of a dental equipment manufacturing plant resulted in various citations, one of which concerned the dental casting machines in the laboratory. The inspector determined that the casting machines mounted in the lab did not meet MIOSHA Standard R 408.10034 (11) which states, "An extractor, parts washer, or tumbler, manually controlled and equipped with an inside revolving cylinder, shall be equipped with a cover or door interlocked in such a manner as to prevent opening the door when the inside cylinder is in motion, and to prevent power operation of the inside cylinder when the cover or door is open. An inch control or constant pressure control which bypasses the interlock may be used to aid loading and unloading." This raised the obvious question: **Are traditional centrifugal dental casting machines mounted in laboratories throughout the country in violation of OSHA safety standards?** In an attempt to answer this question, the National Board for Certification of Dental Laboratories (NBCDL), an administratively independent trust under the National Association of Dental Laboratories (NADL), retained the services of an engineering consultant. The consultant performed an extensive analysis of the casting process and requested from OSHA an interpretation of machine guarding requirements in relation to dental casting machines. The request for interpretation was in relation to OSHA Standard 29 CFR 1910.212 (a)(1), a close corollary to the MIOSHA standard originally cited. OSHA never responded to his request or to a follow-up request. The consultant's professional opinion, which he provided to the NBCDL, was that casting machines as traditionally



mounted in dental laboratories are not in violation of OSHA Standard 29 CFR 1910.212(a)(1). Further information regarding this interpretation can be found in the following linked article, which was originally posted on the NADL's website (copy of article posted with permission of NADL).

[For link to NADL article regarding casting machine lids click here.](#)

DIS recommends that until definitive guidance is provided by OSHA, USAF dental facilities continue using traditional casting machines. Clinics should continue to document safety training regarding the use of these machines and post a highly visible sign near the machine giving a warning to the effect, "Casting Machine: For Use by Authorized Personnel Only."

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