

Lead Testing for Children's Metal Jewelry FAQ*

The following is a compilation of questions and answers dealing with lead testing methods for children's metal jewelry. For clarifications or for answers to additional questions, please contact Theresa Rogers at (301) 504-7584 or Mary Toro at (301) 504-7586.

1. Q: How fast, and in what fashion do you shake the samples for the acid extraction?
A: Our method was developed based upon similar methods in ASTM D5517 "Standard Test Method for Determining Extractability of Metals from Art Materials[†]," and ASTM F963 "Standard Consumer Safety Specification on Toy Safety", which specify to "shake efficiently." Staff has typically interpreted that as 50 back-and-forth (reciprocal or 180°) cycles per minute with approximately 38mm (1.5 inch) stroke-length based on the volume of liquid and the capabilities of our laboratory shaker. However, for atypical sample sizes, it may be appropriate to change slightly to maintain good mixing without too great a splashing onto the stoppers of the containers, most likely in the range of 30-60 cycles per minute. For the extractions, the shaker bath is controlled to 37°C.
2. Q: Do you cut or grind the samples for the total lead method?
A: Samples are usually ground with a rotary grinding/cutting tool with carbide tipped grinder for total lead in children's toy metal jewelry. This requires scrupulous cleaning (disassemble and clean with water and wipes) or disposal of contact areas of the grinder to prevent cross contamination. Grinding the samples reduces the time required to ensure full digestion of any potential lead. Coarsely cut samples may require longer digestion times.
3. Q: Do you cut or grind samples for the acid extraction method?
A: No. Samples are extracted intact as described in the method released on February 3, 2005.
4. Q: How do you separate sub-pieces within the jewelry without damaging them before extracting?
A: Metal jewelry comes in various configurations and, as such, each item of metal jewelry is treated individually. (From our experience, there may be significant differences in levels of accessible lead in different components of a jewelry item.) For example, if an item has three components, the staff will isolate the different types of components and test a representative of each component type individually. This procedure may entail disassembly of an item by separating each of the distinct types of components (such as hook, chain, pendant, etc.) by simple manual separation or

* These comments are those of the CPSC staff, have not been approved by, and may not necessarily reflect the views of, the Commission.

[†] ASTM Methods are available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA, or online at www.astm.org.

even by cutting in such a way that each component of interest can be removed undamaged from the whole. Thus the staff may remove each piece by hand or may cut off clasps, beads, hooks, pendants, or other items in order to isolate and test each individually. However, when testing for the extractable portion of the sample, care is taken to not damage the surface of the item being tested. This may require multiple samples to ensure that the surface is intact during the extraction portion of the testing. (For example the chain could be cut from one sample to remove the hook intact, and from another the hook could be cut to remove the chain intact.) Cutting the sample may cause damage to the coating of the individual pieces and would give a false extraction result. If it is impossible to separate pieces without damaging, they are tested together.

5. Q: When you measure the extractable lead in a piece of jewelry with many different components, such as hooks, beads and pendants do you take action based on the extractable lead in a single component in the jewelry?

A: Yes. If a unit of Children's Metal Jewelry (CMJ) consists of many different components, such as, clasp, chain, beads, charms, or other items, and any one components has accessible lead levels above the enforcement guide level, the whole item would be considered a potentially banned CMJ.

6. Q: Do you wash the samples before testing?

A: No. Samples are tested as supplied. Typically staff collects samples in intact consumer packaging.

7. Q: Do you perform any durability testing of coatings or mimic any sort of normal wear-and-tear before testing?

A: No.

8. Q: Do you test the lead levels in the electroplated coatings on metal jewelry?

A: Electroplated coatings are treated as an integral portion of the jewelry piece and are not removed before testing. See (4) above for additional information on separation of components.

9. Q: Do you test the lead levels in painted coatings on metal jewelry?

A: Yes. The surface coatings on children's metal jewelry are removed and tested separately for lead in paint according to 16 C.F.R. Part 1303. The analysis is done according to AOAC Official Method 974.02 "Lead in Paint[‡]".

10. Q: Could a lesser amount of acid be used instead of 50:1 as specified for the extraction?

[‡] AOAC Methods are available from AOAC International, 481 North Frederick Avenue, Suite 500, Gaithersburg, MD 20877-2417 USA or online at www.aoac.org.

A: No. Our method is based on ASTM F963 and ASTM D5517 which specify a 50:1 ratio of acid to sample.

11. Q: What do you use as a standard reference material (SRM)?

A: Commission staff use one of several SRM's of lead base alloys from the National Institute of Standards and Technology (NIST), including NIST SRM 1129 "Solder (63Sn-37Pb)[§]" in powder form as a quality control check on our total lead in metals testing. No standard reference material is used for the acid extraction test, as no SRM is known for this purpose.

12. Q: Can an Atomic Absorption (AA) Spectrometry be used instead of Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)?

A: The equipment described in the test methodology is the equipment that our laboratory owns. Our method makes reference to ASTM E1613 "Standard Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques." Any of the 3 pieces of equipment in that standard would be equivalent to using an ICP for this purpose and would pose no concern. Use of Inductively Coupled Plasma Mass Spectrometry (ICP-MS) would be acceptable also under the appropriate conditions.

13. Q: Our company makes xyz consumer product, and we would like to ensure there is no hazardous lead in our product – how would you test this type of product?

A: The Commission addresses hazardous exposures to lead in consumer products under the Consumer Product Safety Act (CPSA) 15 U.S.C. § 2051 – 2084 and the Federal Hazardous Substances Act (FHSA) 15 U.S.C. § 1261 – 1278. Specifically, the Commission has issued guidance urging manufacturers to reduce the lead content of their products to the greatest extent possible (16 C.F.R § 1500.230); banned paint containing lead in excess of 0.06 percent by weight (16 C.F.R § 1303); and banned metal-cored candlewicks containing more than 0.06 percent lead by weight in the metal and candles with such wicks (16 C.F.R § 1500.12). Art materials, such as crayons, are addressed under 16 C.F.R § 1500.14. Children's metal jewelry is treated as described in the staff guidance published February 3, 2005. To evaluate the potential hazard associated with other products that contain lead, as stated in 16 C.F.R § 1500.230, the Commission staff considers the following major factors on a case-by-case basis: the total amount of lead contained in a product, the bioavailability of the lead, the accessibility of the lead to children, the age and foreseeable behavior of the

[§] NIST SRM's are available from Standard Reference Materials Group, National Institute of Standards and Technology, 100 Bureau Drive, Stop 2322 Gaithersburg, MD 20899-2322 USA or online at <http://ts.nist.gov/ts/htdocs/230/232/232.htm>.

children exposed to the product, the foreseeable duration of the exposure, and the marketing, patterns of use, and life cycle of the product. Staff encourages manufacturers, importers, distributors, and retailers to employ methods such as the methodology published for lead in children's metal jewelry, and standard methods referenced therein such as ASTM F963, ASTM D5517, and AOAC 974.02. In addition to total lead analysis and acid extraction tests, wipe testing and saline extraction testing may be appropriate for some items, depending on their method of use, size, etc. CPSC staff reports on lead in vinyl miniblinds (September 1996) and lead and cadmium in children's polyvinyl chloride (PVC) products (November 1997) should be reviewed for discussions of lead limits and testing of these type of products.