



## Testing for Lead in Consumer Items for Children

Consumers wishing to test objects to determine lead content are faced with several choices. Each method has its strengths and weaknesses, which are described below. It may not be worth the expense to test inexpensive trinkets, costume jewelry, toys and other similar items. In addition, products that do not come into contact with humans (e.g. a leaded-glass vase that is used only for decoration or for flowers) present less risk. This document does not cover the testing of candy or food for lead.

If parents or caregivers believe that their child may have been exposed to lead, they should consult the child's pediatrician about getting a blood lead test. This is the best way to determine actual exposure if it has already occurred. Many children in the U.S. are exposed to lead through contact with old paint in housing, deteriorated paint, settled house dust and bare contaminated soil. Parents and caregivers should consider obtaining a lead-based paint inspection and/or risk assessment if they live in a house, or if the child regularly visits a house that was built before 1978, which is when lead paint was banned for residential use. More information about this is provided at the end of this document.

This document describes testing options for consumers concerned about lead in various consumer items, toys, trinkets, children's furniture, vinyl or plastic objects and other similar items.

### **Laboratory Tests for Total Lead Content**

Consumers can send products including, but not limited to, dinnerware or children's toys, furniture, vinyl bibs, lunch boxes and other similar items to a laboratory for analysis. A portion of the object or the paint on the object will be weighed and then subjected to an acid or other dissolving agent. The dissolving agent depends on the object being tested. This step enables the lead to be dissolved so that it can be quantified. These methods are the most accurate and precise means of lead determination. However, they are destructive because part of the product has to be removed and destroyed to do the analysis. It may not be necessary to destroy the entire object, because sometimes only a very small and insignificant sample is needed for analysis. If the object is to be used again after testing, it should be thoroughly washed to remove any chemical residue. Consumers should only use laboratories that are recognized under EPA's Lead Laboratory Proficiency Analytical Testing Program, which can be found at: <http://www.epa.gov/lead/pubs/nllaplist.pdf>.

Always contact the laboratory before any sample or object is sent to them for analysis to find out the laboratory's specific procedures regarding shipping, specific analysis requested, cost and other details. The laboratory can help consumers interpret the results. In general, 600 parts per million (ppm) or above is considered to be a potential problem. Some laboratories may report the results in weight percent or other units (600 ppm = 0.06% = 600 micrograms/gram = 600 milligrams/kilogram), which is the limit set by the Consumer Product Safety Commission for the allowable level in new residential or toy paint. Depending on local factors, the cost can be between \$5 - \$35 per sample for this type of analysis.



## Laboratory Tests for Leachable or Accessible or Bioavailable Lead

Unlike the above laboratory methods, which determine how much lead is present in a product, tests for “leachable” lead determine how much lead in an object might be dissolved in the saliva and digestive tract of a person. The federal government uses this method to determine the safety of many types of children’s products such as jewelry and plastics. These methods are sometimes used for dinnerware, cups and glasses, utensils and other objects.

These methods do not destroy part of the item to recover all the lead it contains and the amount found by the various methods used can vary widely. For example, the method used may not be able to detect lead that is beneath an intact coating on a product. As a product is used or if it is damaged, the coating may be worn away, increasing the exposure to lead. There is also no agreement that the methods used adequately represent what happens in the digestive tract. The Food and Drug Administration has set standards for dinnerware of no more than 3.0 µg/mL (micrograms of lead per milliliter of leachate). California has adopted lower levels: 0.226 µg/mL lead for flatware, and 0.100 µg/mL for hollowware, such as cups and bowls. This type of laboratory test may not destroy the sample or item, although consumers should always contact the laboratory first for details. Items tested with this method should be thoroughly washed prior to use to remove any chemical residue. Depending on local factors, the cost can be between \$20 - \$50 per sample.

## XRF Testing

X-Ray Fluorescence (XRF) is a non-destructive method of testing for lead content. It has been used successfully for measuring lead in soil and paint, including paint on children’s toys, furniture, and other objects. Lead-based paint inspectors and some laboratories may have these devices, which exist in both portable and fixed forms. Portable XRF devices allow consumers to have items tested in their homes. Consumers can also request measurement of lead in paint in their homes using these devices. Consumers should only use state or EPA-licensed or certified lead-based paint inspectors to perform these tests. A list of such inspectors can usually be obtained from the State Health Department or by contacting the National Lead Information Center at 1-800-424-LEAD. Inspectors should confirm that the XRF instrument they use has a Performance Characteristics Sheet, which is an independent evaluation of the device from the federal government.

XRF testing of toys or other objects may depend on the object’s shape and size. Objects with irregular surfaces or surfaces less than a square inch may not be easily measured with this method. Results are sometimes available within a few minutes or less for some objects. For paint, XRF analyzers typically report results in terms of milligrams of lead per square centimeter of surface area (mg/cm<sup>2</sup>) and may report results in parts per million (ppm). For lead in or on toys, consumers should request that the results of XRF analysis also be reported in parts per million (ppm) or weight percent (%). Readings above 600 ppm or equal to or more than 1 mg/cm<sup>2</sup> generally indicate a possible problem. An XRF reading below 1 mg/cm<sup>2</sup> (especially for paint) by itself does not necessarily mean there is not a lead problem. When the XRF analyzer is capable of reading in both ppm and mg/cm<sup>2</sup>, the levels should be below **both** 600 ppm and 1 mg/cm<sup>2</sup>. It is not possible to convert ppm into mg/cm<sup>2</sup>. The cost per reading depends on the number of samples to be analyzed and the inspector’s time.



## Color Change Tests

These tests, which are available at many hardware and home repair stores as kits (sometimes called “swab” tests), rely on a color change to determine the presence or absence of lead. For example, in one common consumer kit, chemical reagents are mixed within in a tube, which has an applicator on the end. The reagents then soak the end of the tube. The applicator end of the tube is rubbed on the surface to be tested and the tester then determines if a pink or other color change is observed on the applicator after a short time. These tests rely on the ability of the reagents in the kit to contact the lead directly and to dissolve some of it. If an overcoating is present, or if the lead is embedded within a plastic, no color change may occur, even though lead may be present. These tests are the most inexpensive, and the results are available within minutes, but because they may not contact the lead surface or dissolve the lead, they are less reliable. They may also give a “false positive” and change color with lead levels well below 600 ppm. If an object is tested using this method, it should be thoroughly washed after the test to remove any remaining chemical residue. The cost is generally about \$2-\$4 per sample, depending on the kit size.

For more information, contact the following agencies:

The Consumer Product Safety Commission, [www.cpsc.org](http://www.cpsc.org)

The U.S. Environmental Protection Agency, [www.epa.gov/lead](http://www.epa.gov/lead)

The U.S. Food and Drug Administration, [www.fda.gov](http://www.fda.gov)

The U.S. Centers for Disease Control and Prevention, [www.cdc.gov](http://www.cdc.gov)

A pamphlet on what families can do about lead poisoning from lead-based paint, dust and soil is available at: [http://www.hud.gov/offices/lead/outreach/pyf\\_eng.pdf](http://www.hud.gov/offices/lead/outreach/pyf_eng.pdf)

NCHH is a national 501c3 non-profit organization dedicated to protecting children from hazards in their homes while preserving affordable housing. NCHH was founded to provide the scientific underpinnings for the lead poisoning prevention movement. Since that time, the number of homes with lead-based paint has dropped from 64 million to 38 million and the number of children with lead poisoning has dropped from 890,000 to 310,000. Today, NCHH conducts research on a broad array of housing-related health issues, including mold, radon, asthma triggers, and the promotion of green and healthy building. Additionally, NCHH engages in policy and training activities to promote decent, safe, and affordable housing in the United States.