
Preventing Lead Poisoning in Radiator Repair Work

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For Owners and Managers of Radiator Repair Businesses

Introduction

Radiator repair work often puts workers at risk of over-exposure to lead. In Washington State's blood-lead tracking system, radiator repair workers have had more cases in the highest blood-lead level category than workers in any other type of business.

Fortunately, lead poisoning is completely preventable. This pamphlet provides information on controlling lead exposures in your shop. Exposures to lead fumes and dust at radiator shops put workers at risk for lead poisoning. "Take-home" exposure by these workers is especially dangerous to children ages six and younger, because lead is toxic to the brain and can cause permanent damage.

Controlling Lead Exposures in Radiator Repair

Controlling exposures at the source is the key to preventing lead poisoning. While it may require a significant initial investment, controlling exposure through ventilation and other means can substantially reduce the number of requirements you are responsible for under the Lead Standard.



Exhaust Ventilation for Radiator Repair Benches

In most radiator repair shops, working at the radiator repair benches is likely to be the source of the highest airborne lead exposure. Personal air samples taken while radiator mechanics are working sometimes show time-weighted average (TWA) levels of lead of $100 \mu\text{g}/\text{m}^3$ and higher, more than twice the Permissible Exposure Limit (PEL). Exposure can be controlled through the proper design, installation, use, and maintenance of a ventilation system that moves the contaminated air away from the worker's breathing zone (face).

Ventilation systems that remove contaminants from the worker's breathing zone can be difficult to design and install properly without experienced help. Obtaining assistance can help you avoid costly mistakes. Free assistance is available through your local Department of Labor & Industries Industrial Hygiene Consultation Program (their telephone number is listed in the "Government Pages" of your local telephone directory), or through the University of Washington's Field Research and Consultation Group, (206) 543-9711. If you enlist a private contractor to design and build your ventilation system, make sure the contractor has experience with ventilation systems for that remove industrial contaminants--not just heating and cooling. You may choose to seek out a Certified Industrial Hygienist (CIH) to help with this process.

Lead exposures can be controlled by installing a booth that encloses the radiator repair bench on the back, top, and sides of the test tank, with the air drawn from the back of the enclosure. Where the existing workstation setup prevents the use of a fully enclosing hood, a modified hood with movable sides or top may be designed and used. When using these hoods, be sure that they are properly positioned during radiator repair.

Enough suction must be maintained through the hood to overcome air currents and to capture contaminants while the radiator is torched, soldered, and/or tested. Alternatively, an elephant trunk, or adjustable arm system, can be used for local exhaust ventilation. This system requires the worker to reposition a hood within a specified distance (such as 12 inches) of the hot work at all times. These systems are not effective if the hood is not positioned correctly. The hood must be repositioned as work progresses around the radiator.

For any exhaust ventilation system used for radiator repair benches:

- ✓ Be sure it is made of materials that are flame-resistant and will not be corroded by caustic materials. Welding curtain material or fiberglass may be used. Metal must be coated with corrosion-resistant materials.
- ✓ Ensure sufficient suction to capture the contaminated air, even when air currents are present (such as when bay doors are open or someone walks by) or when torching is being done. A hood and fan high on the wall above the tank is probably not sufficient.

- ✓ Be sure the system pulls air away from the worker, not past the worker's face (this can make the exposure higher).
- ✓ Plan to inspect the system weekly. Check the air velocity at its entrance monthly, and keep a record of these activities. A pressure gauge installed as part of the system can be useful.
- ✓ Use respiratory protection when cleaning or maintaining the system.
- ✓ A ventilation system is only effective if it is designed, maintained, positioned, and used properly.

Controlling Lead on Surfaces in the Shop

In radiator repair businesses, lead may be present in significant amounts all over the shop: in work areas, on the lunch table, on doorknobs, and on telephones. Surface lead can raise workers' total exposure when even tiny amounts of dust are stirred into the air and breathed, or when lead gets on the hands and face and is swallowed. Lead dust can be breathed or swallowed, but it does not pass through the skin.

There are two ways of controlling lead on surfaces:

- Control the sources of lead. When the radiator repair bench is controlled, lead will not spread from there to the rest of the shop.
- Clean up. Never sweep the floor-- this stirs up dust, making lead exposures worse. Use a HEPA vacuum and then wet-wash the surface with warm water and detergent. After the area has dried, the surface should be vacuumed once more. Frequently wipe surfaces such as lunch tables with a wet cloth.

Enclosing Abrasive Blasting Units

When cleaning tanks, a grinding wheel can expose the worker to lead solder dust and spread lead throughout the shop. A small abrasive blasting unit allows the work to be done in an enclosure that is vented to the outside. Be sure leakage is not occurring. After blasting, wait until the dust in the enclosure has completely settled before removing the work piece. Extreme caution should be taken when cleaning or emptying the air-cleaning devices.



Lead-Free Solder

Typical solder contains 60% lead. Several companies now make a lead-free solder (made of tin, copper, and silver), which can help reduce lead exposures. However, since many radiators still have lead solder, the use of lead-free solder will not entirely eliminate exposures.

Other sources of information

SHARP Publication "Working with lead: How to protect workers' health" describes lead's health effects, blood lead testing, exposure controls, and summarizes Washington State's Lead Standard (WAC 296-62-07521).

If you have any questions about lead regulations, you can call your local L&I office and ask to speak to an Industrial Hygiene Consultant. Their telephone number is listed in the "Government Pages" of your local telephone directory. These consultants provide a confidential, no-fee service. Safety & Health consultants can provide an on-site assessment of your facility, including air-testing capabilities. You can also find more information by visiting L&I's web site: www.lni.wa.gov.

Industrial ventilation questions can be addressed to L&I's consultants or to Janet Kurina, Policy & Technical Services, Department of Labor & Industries, (360) 902-5478.

The University of Washington provides on-site consultation services through:

University of Washington,
Field Research & Consultation Group,
4225 Roosevelt Way,
Seattle, WA 98105.
(206) 543-9711

Relevant Yellow Page headings include:

- Industrial Hygiene Consultants
- Safety Equipment and Clothing (respirators, coveralls, etc.)

What is SHARP?

SHARP stands for Safety & Health Assessment & Research for Prevention. SHARP is a multidisciplinary research program within the Washington State Department of Labor and Industries, whose mission is to conduct research, monitoring, and demonstration projects that promote healthy work environments and the prevention of workplace injuries and illnesses.

SHARP was created by the Washington State Legislature in 1990. SHARP has addressed a diverse range of occupational health concerns in response to requests from employers, labor, health care professionals, and agency staff. SHARP's research specialists offer expertise in computer systems, economics, epidemiology, ergonomics, industrial hygiene, occupational medicine, nursing, and toxicology.

SHARP maintains the Occupational Lead Exposure Registry and can provide further information to interested employers on work-related lead poisoning and methods of prevention.

You can contact us at:

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**Check out SHARP on the
World Wide Web:**

www.lni.wa.gov/sharp

SHARP's web site provides more information about the SHARP program, describes SHARP's research interests, lists our publications (many are available on-line), introduces the SHARP team, and provides links to other sites of occupational and environmental interest.