

Still trying to ... GET THE LEAD OUT

As early as 370 B.C., Hippocrates identified lead as an occupational hazard in miners and metallurgists. Throughout history, occupational health practitioners, including Dr. Alice Hamilton, have strived to protect exposed individuals from the toxic effects of lead. Despite these efforts, lead continues to be one of the most common overexposures found in industry and is a leading cause of occupational illness. Lead poisoning is also the leading environmentally induced illness in children¹.

Given these grim facts, public health agencies continue efforts to reduce the toxic effects of lead. The most critical steps toward lead hazard abatement are **contaminant identification** and **removal**. Researchers from CDC/NIOSH have developed two simple and reliable technologies to achieve these steps easily and without the need for extensive training. Used together, these methods can help to reduce exposures to this age-old contaminant.

New NIOSH Technologies for Lead

Colorimetric Field Detection Kit for Contaminant Identification

After a work shift in a battery plant or a practice round at a firing range, exposed individuals may have significant lead residue on their skin. This can be a hazard not only to the individual, but also to family members when lead enters the home on skin and clothing. In this case, lead becomes a “take-home toxic.”

To address this concern, NIOSH researchers developed a field detection kit (see Figure 1) that provides a qualitative colorimetric indication of the presence of lead at levels ≥ 18 micrograms (μg). Here is how the kit works:

1. At the end of the exposure period, a wet wipe in the kit is used to wipe exposed skin surfaces such as the hands, face, and neck.
 2. The wipe is sprayed with the kit's Reagent A and Reagent B.
 3. If lead is present at or above $18 \mu\text{g}$, a red color will develop on the wipe (see Figure 2).
 4. This is an indication that more decontamination is necessary to remove lead from exposed skin areas.
- As such, the kit serves both as a hazard identification tool and as a behavior modification tool.



Figure 1. Colorimetric Field Detection Kit



Figure 2. Positive Result: Lead present at $\geq 18 \mu\text{g}$

Decontamination Towels for Metal Removal

Soap and water are not the best vehicles for removing metals from skin. NIOSH researchers have developed a better way to remove lead by using a specially engineered pre-moistened towel.²

Beta version: New NIOSH Wipe
Removal Efficiency = 99.8%²

The towel contains active ingredients that remove lead and other metals through several mechanisms. In addition to surfaction and mechanical action, the towel's unique formulation irreversibly binds the metals through pH adjustment and chelation. This combination of mechanisms result in removal of 98% of lead from exposed skin (see Figure 3). The towel has been shown to also be effective for other metals including cadmium, mercury, and arsenic.

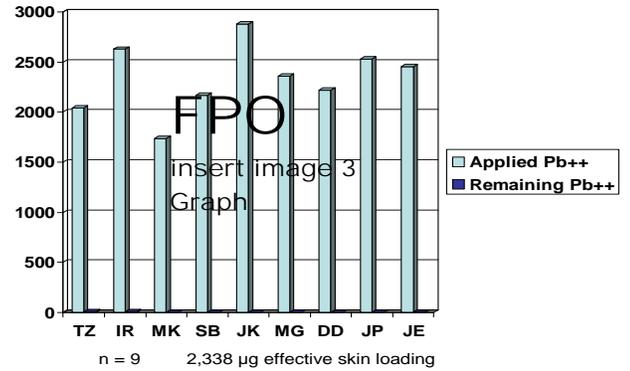


Figure 3. Decontamination Towel Efficiency Data

After wiping skin, the towel is discarded and the wiped skin is rinsed thoroughly with water (see Figure 4). The result is skin that is free of metal contaminants, fresh, and conditioned. The towel is also a “green” choice, as its active ingredients will not pollute or persist in the environment. A Material Safety Data Sheet for the towel is available online at www.skcinc.com.



Figure 4. Wipe with Decontamination Towel and rinse for 98% lead removal

Perfect Partners for Lead Control

The colorimetric field detection kit and the decontamination towel can be partnered for a complete lead safety system that provides:

- **Identification** of the presence of lead
- **Decontamination** of lead from the skin
- **Confirmation** of complete lead removal

Through the Federal Technology Transfer Act, these NIOSH technologies are available commercially from SKC Inc. in Eighty Four, PA. Complete information is available at www.leadwipe.com

Conclusions

The new NIOSH technologies should help reduce the incidence of lead-related illness. The NIOSH innovations have been packaged to make lead detection and removal easy and convenient in the field. Lead workers can themselves perform the critical steps necessary to recognize and abate lead hazards to which they are exposed. Maybe we can now GET THE LEAD OUT!

References:

1. Larsen, R., Church, J, “Hot Topics in Toxicology,” *The Synergist*, Sept. 2008: 49-50, available www.aiha.org/Idocuments/synergist/08Sept_Synergist.pdf

2. Esswein, E., Boeniger, M., Ashley, K., “Real Occupational Hygiene: What Does it Take to Remove Toxic Metals from Skin?” AIHce 2009, Toronto, Canada

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