Advice & Counsel



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Do it Yourself PEL Testing

Dear Advice & Counsel,

I have followed your recent articles on hexavalent chromium issues (and sent a donation to the AESF Government Relations Fund). My company performs a variety of processes that involve hexavalent chromium, and the cost of hiring an industrial hygienist and measuring the PEL at various operations is quite high. Is there any way that I can do this myself?

Signed, Bob Vila Jr.

Dear Mr. Vila,

The measuring of a hexavalent chromium PEL is best left to a professional (your insurance company may conduct this testing for free).

If you wish to do it yourself, you can probably get a reasonable estimate of whether you meet the proposed OSHA PEL or are over the 1 :/m³ limit/0.5 :/m³ action level, by contacting your laboratory/ consultant and asking them if you can rent personnel sampling pumps from them, and if they can analyze for hexavalent chromium by OSHA method 215.

If you can rent the sampling pumps and get instructions for conducting a measurement, you are half way there. Fig. 1 is the type of equipment required. You will be provided with instructions on how to operate the pump.

The next step is to identify the worker or workers that is/are most likely to get the highest exposure for each process utilizing hexavalent chromium. In most cases this will be the person walking the process line with the parts. On automated lines this may be racking/un-racking personnel stationed near the tank containing the chromium. Don't forget to consider the worker who is assigned the duty of adding hexavalent chromium-bearing liquids and solids to the process tank, especially if that worker also works near processes containing hex-chromium the rest of the working day.

Next check over any ventilation system

that is used on the process or processes that contain hexchromium, and make sure that it is functional, and operating under normal conditions. Make any repairs necessary before choosing the test day and conducting the test. This may also be a good time to clean up any errant chromium bearing materials from tank to prevent production

of airborne hex-chromium from outside the process (don't do this if you are looking for a worst case exposure number).

Now pick a day when the worker will be either performing an average day (if you want an average reading) or a day considered to be a "worst case", such as a high production day, when a line worker



Fig. 2-Breathing zone for PEL testing.



and walking surfaces Fig. 1–Equipment required for PEL testing.

may also be adding chemicals to the hexprocess.

Now talk to each worker and explain that you wish to conduct a test that will involve them wearing a portable pump attached to their belt. The pump will need to be worn the entire (8 hour) working day including lunches and breaks. The worker must not move or touch the pump and associated tubing and cassette during the test period. If he/she has a problem, they should see you before they touch the equipment. The cassette at the end of the tubing is the most important part of the sampling train and it must not be touched by the worker at any time. The slightest touch may contaminate the cassette and give you a false high PEL reading (keep in mind that the limit is 50 times lower than the current limit, so even the most minute amount entering the cassette erroneously will result in a poor test result.

When installing the sampling train on a worker, be sure to have the filter cassette at the end of the tubing in the worker's breathing zone (see fig.2). This typically can be accomplished by clipping the cassette to the collar of the shirt. You can use duct tape to firmly hold the cassette

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science, is cheering Zambia's intransigence. And the willingness of Greenpeace, Friends of the Earth and the like to let Africans starve in the name of someone else's ideology is [remarkable].^{''8}

So what if Americans have been consuming this corn for years (over 34 percent of all U.S. corn and 78 percent of its soybeans are genetically modified).⁸

More from the *Wall Street Journal*, "The eco-lobby has targeted the Third World with a five year \$175 million campaign against GM foods. The Sierra Club is calling 'for a moratorium on the planting of all genetically engineered crops.' Greenpeace say it 'opposes all releases of genetically engineered organisms into the environment.' an act it calls 'genetic pollution.'⁹ This is a lot of money and effort to help starving people continue to starve."

Summary

"Environmental activists 'romanticize poverty, then they fly to 'eco summits' like one in Johannesburg, where they stay in fivestar hotels, talking about poverty but not giving options to the people who are actually poor to come out of poverty. And for this, they are deemed to be 'responsible,' concerned about the poor, moral and 'passionate about the environment.""¹⁰

Greenpeace co-founder Patrick Moore, now an outspoken critic of the group he once led, looks at it this way, "I helped start the environmental movement to protect people, as well as our planet," he said. "Unfortunately, too many policies today ignore the needs of the Earth's poorest people. That's not just unnecessary. It's eco-imperialism. It's counter-productive, and morally wrong."¹¹

Ironic isn't it? Folks who worry and protest about the latest parts per zillion of some contaminant in our air or food, because they claim it will kill people, choose to ignore environmental issues in developing countries that could save millions in real time.

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Finishers' Think Tank Continued from page 35

- Inhibitors that form a protective barrier on the surface. This prevents over pickling or etching of the base material, after preferred conditioning has been accomplished.
- Buffers maintain optimum solution activity, prolonging the bath service life.
- Chlorides and fluorides may be incorporated in the blended acid (more commonly in powders). Dissolving the concentrate, forms additional acidic agents, for more powerful and effective surface conditioning.
- Wetting agents provide additional cleaning to remove oils and grease. They also generate and maintain a light foam blanket, which effectively eliminates corrosive misting.
- Another class of inhibitors extend the acid service life by preventing the immersion deposition of metals, such as copper on the parts being processed. Some of these additives also precipitate metal contaminants, in another way to extend the acid bath.

Extending the acid bath service life minimizes the interruption of production schedules, required to drain the old acid and make up a new one. Less acid dumps also reduce demands and consumption of additives in the waste treatment system.

The proprietary acids are available in forms that vary according to the needs of the metal finisher. The plain mineral acids can be supplemented with additive packages, containing wetters and inhibitors. Powder concentrates usually contain any or all of the candidate additives mentioned previously. Handling the powders is safer and less hazardous compared to the liquid mineral acids.

It makes practical sense to improve and streamline the surface preparation segment. This will only enhance the finishing steps (electro/electroless plating and post finishing) that must now accommodate new stricter regulations and mandates. But, the cleaning and activation steps should also indicate these treatments improve safety and contribute to environmental stewardship.

Next month we check up on trivalent chromates. *P&SF*

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in place. Don't allow the cassette to flop around as the worker walks, if at all possible.

Have the worker complete a "diary" of his working day so that you can use this information to identify any activities that may contribute to high readings. Stress to the worker how important it is to put entries into the diary as he/she is working, not at the end of the day. The diary should include the time of day, activity and duration of activity.

Depending on how dependable your workers are, you might want to conduct a "dry run" before doing the actual test. You can clip an empty box with tubing onto the worker and have them complete the diary. When you are satisfied that all is going according to Hoyle, you can do the actual test. Don't do too many dry runs, or the workers will get tired of completing the diary over and over.

When the sampling period is complete you will need to send the cassette off to a laboratory equipped with an Ion Chromatograph set up for OSHA method 215 for hexavalent chromium. This newer method was approved by OSHA in 1998. The older method (OSHA ID-103) does not have sufficient sensitivity to detect the low levels OSHA proposes. *P&SF*



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