HTIS
Hazardous Technical Information Services
BULLETIN
Vol. 20, No.6 November – December 2010

Maintenance Center Albany Puts The Hex on Hexavalent Chromium

— Safer Substitute Found for Anodizing Aluminum Parts

The Marine Corps Logistics Command (LOGCOM) Maintenance Center Albany (MCA) recently replaced a hexavalent chromium (Cr(IV)) anodizing process for aluminum parts with a more benign trivalent chromium process.

LOGCOM, located in Albany, Georgia, is the focal point for the planning and execution of maintenance management for ground weapon systems for U.S. Marines. As the leadership organization for the two maintenance centers that maintain, repair and rebuild ground combat and support equipment, Logistics Command encourages all efforts to improve security, support and safety of providers and users. Each maintenance center strives to improvise, improve and enhance product refinement, development and security.

An important part of LOGCOM's work revolves around the anodization of aluminum parts. The anodizing process oxidizes and creates a protective coating on the metal, also known as a conversion coating. Traditionally hexavalent chromium has been a key ingredient in the process, but hexavalent chromium is also a well-known toxin. The Occupational Safety and Health Administration (OSHA) has stated that hexavalent chromium may cause cancer in workers who breathe airborne emissions.

Due to the serious health and environmental risks related to the use of hexavalent chromium, national and international restrictions and controls are increasing. These restrictions will continue to increase lifecycle costs and regulatory burdens while

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decreasing material availability. A recent memo (dated 25 November 2008) disseminated by the Office of Secretary of Defense, directs the Department of Defense (DoD) to make substantial investments in finding suitable replacements for hexavalent chromium applications.

Lamar Petties, MCA Risk Management Manager, discusses the reasons for choosing trivalent chromium as a replacement. "Trivalent chromium is better for not only the work environment, but the larger environment. It is cheaper in the long run because it doesn't cost as much for disposal." As far as processes go, there won't be a noticeable difference. "Both the hexavalent chromium and trivalent chromium anodizing are dip-tank processes requiring parts to be dipped into containers of the solution," says Petties. "With the trivalent chromium process, we become more environmentally compliant, create a safer working environment, and will have equaled, if not increased, corrosion protection."

Lee Sanders is the National Sales Manager for Government and Military accounts for Chemetall, the chemical company that is providing the trivalent chromium product, Metalast TCP-HF. Mr. Sanders stated, "This is proof that government can keep up with civilian manufacturing in innovation and technology. Being the first DoD depot to make this change was not scary for them once they thoroughly studied the technology and calculated the benefits. There is no longer a reason to use hexavalent chromium for conversion coatings and seals. Any agency reluctant to change needs to review the alternatives."

- Regulatory compliance.

The trivalent chromium transition initiative was an element of a larger phased project which focused on removing hexavalent chromium from all of the production processes of the LOGCOM depots. Phase I of this initiative commenced nearly ten years ago, and included a joint project with the Army Research Laboratory and the Naval Surface Warfare Center, Carderock Division. This project successfully removed hexavalent chromium from United States Marine Corps primers and topcoats.

Phase II focused on a two-part effort that led to the removal of hexavalent chromium in the anodizing process and the discovery of a safer product that met the same performance specifications. Phase II also addressed the depot's hazardous chromium plating operations. After a technical and cost-benefit analysis, the decision was made to outsource chromium plating operations.

As a result of Operation Iraqi Freedom, the armor and stainless steel workloads in MCA were significantly expanded. Phase III was initiated to address the hazards created from welding and grinding operations. The high temperatures generated in these processes can cause chromium to convert to a hexavalent state.

Teaming with the National Defense Center for Environmental Excellence, Concurrent Technologies Corporation, and several other industry partners, a Sustainable Installations Initiative

Due to the serious health and environmental risks related to the use of hexavalent chromium, national and international restrictions and controls are increasing.

Mr. Sanders sees trivalent chromium as a solid stepping stone to a no-environmental-impact conversion coating. The chemical coatings industry is reaching a point that he calls "the chemical equivalent of putting a man on the moon." He adds, "We now have products that contain no metal and perform as well as zinc phosphate."

Today's chromium-containing coatings are environmentally and waste stream friendly. These products are making their way through the testing programs at various government research agencies for future use on military equipment.

The benefits of the new trivalent chromium process include:

- Air-emission reductions,
- Reductions in wastewater treatment and hazardous waste generation,
- Energy use reductions,
- Quality improvements,
- Lower toxicity and worker exposure, and

Project: "Hexavalent Chromium (Welding) Emissions Reductions" was launched in Fiscal Year 2006. The project included baseline hexavalent chromium emissions in the welding and grinding operations and finding the best solution to ensure short- and long-term compliance with OSHA hexavalent chromium limits. The team also identified air filtration equipment that can mitigate emissions with the least impact on output and welder ergonomics.

As a result of these efforts, MCA has successfully eliminated hexavalent chromium in all of their production processes. Not only have they significantly enhanced working conditions for employees, but they have accomplished it in a cost-effective manner without impacting production.

Steve Allen, MCA Coatings Branch Manager said, "What we are doing today is on the cutting edge in multiple areas. This kind of thinking is important in cleaning up the environment, making working conditions safer while still getting the job done. We are probably riding the crest of the wave in this technology."

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News From DoT

Requirements for —
Outer Packagings Onboard Aircraft

By Muhammad Hanif, Chemist, HTIS

Cylinders containing a compressed gas, typically, have a pressure relief mechanism that releases the gas from the cylinder when the pressure inside the cylinder approaches a pressure detrimental to the cylinder especially when exposed to heat. For safe handling and to prevent damage from heat, shippers provide an overpack or outer packaging for a cylinder to extend the time that it takes for the cylinders to trigger the pressure relief mechanism.

There are instances where it is advantageous to delay the operation of a pressure-relief mechanism to prevent the contents of the cylinder from being released. One such instance involves the transportation of compressed oxygen cylinders in cargo holes. If the cargo hole has flame retardant walls, and is sealed, the fire may smolder or suffocate before causing any serious damage. In such a situation, it would be disadvantageous for the oxygen inside the cylinders to be released into the area surrounding the cylinders because the oxygen would worsen the fire. In other instances where an overpack would prove to be advantageous would include the shipment of toxic gases in cylinders in cargo holes.

In June 2009, in cooperation with the Federal Aviation Administration (FAA), the Pipeline and Hazardous Materials Safety Administration (PHMSA) issued the following Advisory Alert titled. "Upcoming October 1, 2009 Compliance Date for Outer Packagings that Meet Certain Flame Penetration and Thermal Resistance Requirements when Transported Aboard Aircraft." This alert is of significant interest to DOD facilities as well as shippers.

The advisory alerted readers that after September 30, 2009, cylinders of compressed oxygen and other oxidizing gases and packages of chemical oxygen generators must be placed in outer packagings that meet certain flame penetration and thermal resistance requirements when transported aboard an aircraft. PHMSA adopted the outer packaging requirement in a final rule developed in cooperation with the Federal Aviation Administration, and published it on January 31, 2007 (72 FR 4442). In a September 28, 2007 (72 FR 55091) final rule, PHMSA and FAA indicated that they would closely monitor the availability of the required outer packaging, and would consider an extension of the October 1, 2009 compliance date, if it was determined that a sufficient supply of the required outer packagings were not available. Eventually, the PHMSA determined that there were a sufficient number of packaging manufacturers available to supply the required outer packagings, and did not extend the October 1, 2009 compliance date.

For a cylinder containing compressed oxygen and other oxidizing gases intended for transportation by aircraft, the following requirements apply:

- The cylinder must be placed in a rigid outer packaging that is capable of passing, as demonstrated by design testing, the Flame Penetration Resistance Test in Appendix E to 49 CFR Part 178.

- The cylinder and the outer packaging must be capable of passing, as demonstrated by design testing, the Thermal Resistance Test specified in Appendix D to 49 CFR Part 178.

- The cylinder and the outer packaging must both be marked and labeled in accordance with Subparts D and E of 49 CFR Part 172. The additional marking, "DOT31FP" is allowed to indicate that the cylinder and the outer packaging are capable of passing, as demonstrated by design testing, the Thermal Resistance Test.

- Prior to each shipment, the package must be visually inspected to verify that all features of the packaging are in good condition, including all latches, hinges, seams, and other features, and that the packaging is free from perforations, cracks, dents, or other abrasions that may negatively affect the flame penetration resistance and thermal resistance characteristics of the packaging.

- A cylinder of compressed oxygen that has been furnished by an aircraft operator to a passenger in accordance with 14 CFR §§121.574, 125.219, or 135.91 is excepted from the outer packaging requirements of paragraph (f)(3) of § 173.302.

For a chemical oxygen generator, and a chemical oxygen generator installed in equipment and intended for transportation by cargo-only aircraft, the following requirements apply:

- The device must be placed in a rigid outer packaging that is capable of passing the Flame Penetration Resistance Test in Appendix E to 49 CFR Part 178 and the Thermal Resistance Test specified in Appendix D to 49 CFR Part 178.

- None of the following conditions may occur when one generator in the package is actuated:
  - Actuation of other generators in the package;
  - Ignition of the packaging materials; and
  - A temperature above 100 °C (212 °F) on the outside surface temperature of the package.
- All features of the packaging must be in good condition, including all latches, hinges, seams, and other features, and the packaging must be free from perforations, cracks, dents, or other abrasions that may negatively affect the flame penetration resistance and thermal resistance characteristics of the packaging, verified by a visual inspection of the package before each shipment.

References:

1. Federal Register Volume 72, Number 188, Friday, September 28, 2007, pages 55091-55100 (72 FR 55091)]

2. Federal Register Volume 72, Number 20, Wednesday, January 31, 2007, Pages 4442 - 94458 (72 FR 4442)

3. Department of Transportation (DOT), PHMSA, Advisory Alert "Upcoming October 1, 2009 Compliance Date for Outer Packagings that Meet Certain Flame Penetration and Thermal Resistance Requirements when Transported Aboard Aircraft, June 2009.

Thoriated Welding Rods May be Regulated for Transportation

By Philip Saunders, Chemical Engineer, HTIS

Introduction

Tungsten welding rods are consumable welding electrodes used in the tungsten inert gas welding processes. These welding rods frequently contain additives such as cerium, lanthanum, thorium or zirconium which are usually present in the form of metal oxides (ThO_2, CeO_2, etc.) at levels between 1 and 2 percent. These additives increase the current carrying capacity of the electrode, and are used in situations where a high-quality, contamination-free weld is required.

A problem arises when the additive is thorium, because thorium exists in nature as the radioactive isotope Th_{232}. While the other additives used in these welding rods have isotopes that may be regulated for transportation, thorium is the only one of these additives that has an isotope which can be restricted for transportation and that occurs naturally at a significant level. Calculations have shown that these welding rods may be regulated for transportation as a Class 7 (radioactive) hazardous material if the rods contain enough thorium and are present in the shipment in sufficient quantities. This article will describe how to determine if a shipment of welding rods is regulated or not.

Calculations

In order to determine if a shipment of welding rods is regulated for transportation, one must perform several calculations concerning the activity of the rods. In describing how to perform these calculations, we will use the material safety data sheet (MSDS) as well as logistics information associated with a recent HTIS inquiry. The welding rods (NSN: 3439-01-032-5978), came in a pack of 10 rods, contained 2.2% thorium oxide (ThO_2), had a density of 19 g/cm^3, and were 7 inches (17.78 cm) in length and 1/16 inches (0.063 in, 0.159 cm) in diameter. Keep in mind that the results of these calculations, and the conclusions drawn for them apply only to these specific welding rods. These calculations must be re-done if any of the characteristics of the rods differs from those presented here.

The first calculation that is required is the determination of how much thorium is in a package of these welding rods. This is done by obtaining the volume of the welding rods in a package, multiplying it by their specific gravity to obtain the mass of the rods, and then multiplying that result by the fraction of Th_{232} contained in the rod. The volume is obtained by using the equation for a volume of a cylinder, $V = \pi \cdot (L \cdot D^2) / 4$, and in this case is 0.352 cm^3/rod. Multiplying that value by the density results in a mass of 6.69 grams per rod or *66.9 grams per pack*.

The fraction of Th_{232} contained in the rod may be calculated by multiplying the fraction of ThO_2 in the rods (2.2% ThO_2) by the molecular weight of Th_{232} (232.04) and dividing that value by the molecular weight of ThO_2 (264.04). In this case, the welding rods consist of *1.93% Th_{232}*. By multiplying the mass of the rods (66.9 g/pack) by the fraction of the metal that is Th_{232} (1.93%/100) we learn that one pack of welding rods contains *1.29 grams of Th_{232}*.

The next calculation involves determining how much radioactive energy (in Curies, Ci) is emitted by one pack of these welding rods and how much is emitted per gram (the activity concentration). To obtain the activity of a single pack, the mass of Th_{232} (1.29 grams) in the rods is multiplied by the specific activity of Th_{232} (1.1×10^{-7} Ci/g) which is obtained from 49 CFR 173.436. In our example, the activity level is *1.42×10^{-7} Ci/pack*. Next, divide the activity per pack (1.42×10^{-7} Ci) by the total mass of the rods in the pack (66.9 g) to obtain its activity concentration of *2.13×10^{-9} Ci/g*.

But is it regulated? It depends.

Now that these calculations have been performed it can be determined if the rods are regulated for transportation. In 49 CFR 173.403, DOT defines a radioactive material as any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified" in the table found in 173.436. What this means is that in order to be regulated as a Class 7 hazardous material, the activity concentration for the rods must exceed the 'Activity Concentration for Exempt Material' (2.7×10^{-10} Ci/g for Th_{232}), and the activity of all of the rods in the consignment

must exceed the 'Activity Limit for Exempt Consignments' (2.7×10^{-7} Ci for Th_{232}).

A simple comparison finds that while the activity concentration for the rods (2.13×10^{-9} Ci/g) exceeds that allowed for exempt material (2.7×10^{-10} Ci/g), the activity for a single pack (1.42×10^{-7} Ci) does not exceed the exempt consignment activity limit (2.7×10^{-7} Ci). Since both values for exempt material must be exceeded to be regulated for transportation, a single pack of these welding rods in a consignment is not regulated. However, in this particular case, if two or more packs of rods are in the same consignment, then the exempt consignment activity limit would be exceeded and the rods would be regulated.

Assuming that the consignment contains a sufficient quantity of welding rods to be regulated for transportation, a proper shipping name must be selected. We reviewed the regulations and contacted the DOT's PHMSA Help Line and determined that the appropriate shipping description should be 'Radioactive Material, Excepted Package – Limited Quantity of Material, Class 7, UN2910' since, per 49 CFR 173.435, there is no limit on the amount of Th_{232} allowed in limited quantity packages as long as the requirements of 173.421 are met.

The Bottom Line

Thoriated welding electrodes may or may not be regulated as a radioactive material, but it all depends on the concentration of the Th_{232} within the rods, and the total activity of the thorium isotope contained in the consignment. A single pack, or even three or four packs in some cases, of Thoriated welding rods in a consignment may not be regulated for transportation; but, care must be taken to ensure that the applicable regulatory thresholds have not been exceeded. An aid for performing these calculations is available upon request by phoning the HTIS Help Line (800-848-4847) or by e-mail (htis@dscr.dla.mil) to obtain the spreadsheet file which allows you to plug in the characteristics of the rod to determine if it is regulated.

Reference:

1. http://www.orau.org/ptp/collection/consumer%20products/weldingrod.htm

2. Thorium Containing Welding Rod (1990s)Oak Ridge Associated Universities.

DoT's Advisory on Personal Electronic Devices

By Abdul Khalid, Chemical Engineer, HTIS

On August 3, 2010, the U.S. Department of Transportation (DOT)'s Pipeline and Hazardous Materials Safety Administration (PHMSA) issued an advisory bulletin (ADB-10-06) informing owners and operators of natural gas pipeline and hazardous liquid pipeline facilities of the risks associated with using personal electronic devices (PEDs) during pipeline operations and maintenance activities. The full text of this document is available online at: http://edocket.access.gpo.gov/2010/2010-18947.htm.

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Reference:

http://edocket.access.gpo.gov/2010/2010-18947.htm.

Environmental News

Lead Opt-Out Provision No Longer in Effect

By Beverly Howell, Industrial Hygienist, HTIS

In April 2008, the Environmental Protection Agency (EPA) issued the Lead Renovation, Repair and Painting (RRP) rule, requiring the use of lead-safe work practices in pre-1978 homes. Lead continues to be a hazard of concern with almost a million children having elevated blood lead levels as a result of exposure to lead hazards. Children exposed to lead can suffer lower intelligence, learning disabilities, and behavior issues. Adults exposed to lead hazards can suffer from high blood pressure and headaches.

The existing regulations had allowed owner-occupants of pre-1978 homes to "opt-out" of having their contractors follow lead-safe work practices if there were no children under six years of age or a pregnant woman living in the home. The **EPA has eliminated the so-called opt-out provision**, because improper renovations in older homes can create lead hazards resulting in harmful health effects for residents and visitors in those homes, regardless of age. The result will better protect children and adult occupants during and after renovation, repair and painting projects.

The EPA's new rule, effective July 6, 2010, removes the opt-out provision and makes the RRP consistent with statutory requirements.

Because of concern that contractors in some areas may be having difficulty accessing training classes, the EPA recently announced that it is providing renovation firms and workers additional time to obtain training and certifications to comply with the new lead rules. The EPA did not take enforcement action for violations of the rule's firm certification requirement

until October 1, 2010, and will not enforce certification requirements against individual renovation workers if they apply to enroll in certified renovator classes by September 30, 2010 and complete the training by December 31, 2010.

At the core of the rule, contractors must use lead-safe work practices and use the following three simple procedures:

- Contain the work area,
- Minimize dust, and
- Cleanup up thoroughly.

Reference: 2010 News Release, "EPA Rule Increases Protection from Lead-Paint Poisoning Agency also extends deadline for required training", July 6, 2010.

EPA Recommends Bioremediation as One of the Principles for Greener Cleanups

By Abdul H. Khalid, Chemical Engineer, HTIS

In March 2010, the U.S. Environmental Protection Agency (EPA) released its four page publication # EPA 542-F-10-006, titled, "Green Remediation Best Management Practices: Bioremediation", which is now available online at: http://www.clu-in.org/s.focus/c/pub/i/1775/.

Bioremediation is considered a quicker and cheaper method than other commonly available remediation methods. The process of bioremediation is natural, and allows cleaning up of harmful chemicals in the environment. Microscopic "bugs" or microbes are allowed to live and grow in contaminated soils and ground water. These bugs or microbes eat certain harmful chemicals such as those found in gasoline or oil spills. The right kind of nutrients, temperature, and the amount of oxygen are maintained in the contaminated soils or in the ground water, thereby, allowing the microbes to grow and multiply to eat the unwanted chemicals contained therein.

"EPA's Principles for Greener Cleanups" outlines the Agency's policy for evaluating and minimizing the environmental 'footprint' of activities undertaken when cleaning up a contaminated site. By using the best management practices, which the EPA recommends in its green remediation fact sheets, project managers and other stakeholders can apply these principles on a routine basis, while maintaining the cleanup objectives, ensuring protectiveness of a remedy, and improving its environmental outcome'.

For further information, contact EPA's point of contact:

Mr. Carlos Pachon
OSWER/OSRT1 at: pachon.carlos@epa.gov.

Reference: U.S. EPA Contaminated Site Cleanup Information (CLU-IN) / Green Remediation at: http://clu-in.org/greenremediation/

Occupational Safety and Health News

NIST Says — Beware of Dim Laser Pointers

By Ariel Rosa, Environmental Protection Specialist, HTIS

The use of green laser pointers has become widespread. The pointers are useful tools for educators in the classroom and at conventions and meetings delivering light that is brighter to the eye than red lasers. However, due to their low cost and ubiquitous supply, these pointers are now purchased and used by the general public, including children, in ways not intended by the manufacturers. As a result, stories have circulated on the web about the potential hazards of inexpensive models.

A team of scientists led by physicist Charles Clark at the National Institute of Standards and Technology (NIST) has put some numbers to the problem. In one case, the group found that a green laser pointer emitted almost twice its rated power level of light, but at the invisible and potentially dangerous infrared wavelengths, rather than green. The new NIST technical note (TN 1668), "A Green Laser Pointer Hazard" released on July 2010 describes the nature of the problem as well as a home test using an inexpensive webcam that can detect excess infrared light being emitted from green lasers.

In 2009, the research team purchased three low cost green laser pointers advertised to have a power output of 10 milliwatts (mW). Measurements showed that one unit emitted dim green light, but delivered infrared levels of nearly 20 mW, powerful enough to cause retinal damage to an individual before he or she is aware of the invisible light. NIST's Jemellie Galang and her colleagues repeated the tests with several other laser pointers and found similarly intense infrared emissions in some, but not all units.

Poor Manufacturing Quality

According to the research team, the problem stems from inadequate quality assurance procedures during manufacturing. Inside a green laser pointer, infrared light from a semiconductor diode laser pumps infrared light at a wavelength of 808 nm into a transparent crystal of yttrium orthovanadate doped with neodymium atoms (Nd:YVO4), causing the crystal to lase even deeper in the infrared, at 1064 nm. This light passes through a crystal of potassium titanyl phosphate (KTP), which emits light

of half the wavelength: 532 nm, the familiar color of the green laser pointer.

However, if the KTP crystal is misaligned, little of the 1064 nm light is converted into green light, and most of it comes out as infrared. Excess infrared leakage can also occur if the coatings at both ends of the crystal that act as mirrors for the infrared laser light are too thin.

The Solution

The NIST team says that this problem can be solved by incorporating an inexpensive infrared filter at the end of the laser that can reduce infrared emissions by 100-1000 times. Although such filters exist in modern digital cameras and more expensive green laser pointers, they often are left out of the inexpensive models.

The team discusses a home test that laser hobbyists can conduct to detect excessive infrared leakage, using a common digital or cell phone camera, a compact disc, a webcam and a TV remote control. Regardless, they say owners of the devices should never point the lasers at the eyes or aim them at surfaces such as windows, which can reflect infrared light back to the user, a particularly subtle hazard because many modern energy-saving windows have coatings designed specifically to reflect infrared.

FDA Advises

The Food and Drug Administration (FDA) is concerned about the increased availability, via the Internet, of a variety of laser products that may be illegal or unsafe. Green laser pointers have the agency particularly concerned. While there are legitimate uses for these green pointers, they may be altered to become more powerful and unsafe if not used responsibly.

"These overpowered pointers may have been modified to emit more radiation than the manufacturer's original product," says Lt. Cmdr. Sean Boyd, M.P.H., head of the Electronic Products branch in CDRH, "and they are not compliant with our standard."

The FDA sets safety standards that must be met before laser products, including pointers, can be legally sold in the U.S. market.

Lt. Cmdr. Boyd also noted that "when you're talking about an overpowered green pointer, the potential for injury or flash blindness increases as you increase the power output of the product". Flash blindness is a temporary loss of vision that occurs when the eye is suddenly exposed to intense light, even from an unintentional sweep of laser light across a person's eyes. The effect can last from several seconds to several minutes. Recent reports of flash blindness in pilots from laser lights beamed at aircraft have further heightened the agency's concerns.

The FDA is working to identify manufacturers of overpowered green laser pointers and other illegal laser products and will take action to prevent these unsafe products from being sold in the United States. The agency may inspect manufacturers of laser products, and require the recall of products that do not comply with federal standards or that have radiation safety defects.

The FDA requires that labeling on most laser products contain a warning about radiation and other hazards, and a statement certifying that the laser complies with FDA safety regulations. The label must also state the power output and the hazard class of the product.

The FDA recognizes four major hazard classes (I to IV), including two subclasses (IIIa and IIIb), of lasers, ranging from those that pose no known hazard to those that pose serious danger if used improperly. The higher the hazard class, the more powerful the laser. Class I laser products, for example, include laser printers and CD players, which are not considered hazardous because the laser radiation is contained within the product.

Class IIIb and class IV laser products are very powerful and permit ready access to the laser radiation, which can cause eye or skin injury. Research and industrial lasers and laser light show projectors fall into these classes. Class IIIb and class IV laser light show projectors may be sold only by or to individuals or firms that have obtained approval from the FDA.

Buyer Beware

The FDA recommends that consumers be cautious when buying laser products over the internet. Consumers may unknowingly purchase an illegal laser product, or may lose their money if the illegal product is refused entry into the U.S. or destroyed.

What Consumers Can Do

- Never aim or shine a laser pointer at anyone.
- Don't buy laser pointers for your children.
- Before purchasing a laser pointer, make sure it has the following information on the label:
  - a statement that it complies with Chapter 21

CFR (the Code of Federal Regulations),

- the manufacturer or distributor's name and the date of manufacture,
- a warning label to avoid exposure to laser radiation, and,
- the class designation, ranging from Class I to IIIa. Class IIIb and IV products should be used only by individuals with proper training and in applications where there is a legitimate need for these high-powered products.

The Green Laser Pointer Hazard researchers are all members of the Joint Quantum Institute, a collaboration of NIST and the University of Maryland. Co-author Edward W. Hagley is also at Acadia Optronics in Rockville, MD.

References:

1. J. Galang, A. Restelli, E.W. Hagley and C.W. Clark, NIST Technical Note (TN 1668), A Green Laser Pointer Hazard (July 2010) Available on-line at www.nist.gov/manuscript-publication-search.cfm?pub_id=906138

2. FDA: http://www.fda.gov/Radiation-EmittingProducts/RadiationSafety/AlertsandNotices/ucm153548.htm.

Starting in Mid–2011 —
New Labels for Light Bulb Packaging

By Abdul H. Khalid, Chemical Engineer, HTIS

On June 18, 2010, the Federal Trade Commission (FTC) announced that effective mid-2011, the standard measurement of light bulbs will transition from watts to lumens.

Consumers will notice a new packaging label that will help them choose among different types of bulbs on the market - from the traditional incandescent bulbs to the newer high efficiency compact fluorescent (CFL) as well as light-emitting diode (LED) bulbs. The new labels will aid consumers in selecting the most efficient bulbs for their lighting needs.

Section 321 of the Energy Independence and Security Act of 2007 requires the Commission to consider the effectiveness of current labeling requirements for lamps (commonly referred to as "light bulbs) and alternative labeling approaches. The Commission sought further comments on several issues for consideration in any subsequent rulemaking, and the comments were due on or before September 20, 2010.

While watt measurements are familiar to consumers, and have been featured on the front of light bulb packages for decades, watts are a measurement of energy use, not brightness. As a result, reliance on watt measurements alone makes it difficult for consumers to compare traditional incandescent bulbs with more efficient bulbs, such as compact fluorescents. A compact fluorescent bulb may be able to produce the same amount of brightness as a traditional incandescent bulb, while using significantly less energy, or watts. New energy standards mandated by Congress will effectively phase out traditional low-efficiency incandescent bulbs from the U.S. market over the next few years. The new labels that focus on brightness in "lumens" will help consumers make purchasing decisions as they transition to more energy-efficient bulbs.

Under the new rule, the back of each package of light bulbs will have a "Lighting Facts" label modeled after the "Nutrition Facts" label that is currently on food packages. The Lighting Facts label will provide information about:

- Brightness;
- Energy cost;
- The bulb's life expectancy;
- Light appearance (for example, if the bulb provides "warm" or "cool" light);
- Wattage (the amount of energy the bulb uses); and,
- Whether the bulb contains mercury.

For more details on the new light bulb label (front, back, and for bulls containing mercury), visit website http://www.ftc.gov/os/2010/06/100618lightbulbs.pdf.

The FTC's points of contact are:

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Attorneys with the:

Division of Enforcement
Bureau of Consumer Protection
Federal Trade Commission (FTC)
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Reference: News Release of June 18, 2010 — "Coming in 2011: New Labels for Light Bulb Packaging", at website, http://www.ftc.gov/opa/2010/06/lightbulbs.shtm.

Hazards of Hot Work Activities Around Storage Tanks

By Ariel Rosa, Environmental Protection Specialist, HTIS

Hot work is defined as burning, welding, or similar spark-producing operations that can ignite fires or explosions.

On June 7, 2010, the U.S. Chemical Safety Board (CSB) released a 14-minute safety video, titled "Danger of Hot Work" that warns of the hazards of welding and other hot work activities in and around storage tanks containing flammable materials. This video presents key lessons from the CSB's Hot Work Safety Bulletin, "Seven Key Lessons to Prevent Worker Deaths During Hot Work In and Around Tanks".

Since the release of the Safety Bulletin in March 2009, there have been, at least, an additional eleven hot work accidents resulting in five fatalities and 14 hospitalizations. Included among these incidents is the explosion and fire at the Navajo Refining Company that killed two workers and injured two others in Artesia, New Mexico, where a crew of insulators was reportedly working on a crude oil storage tank.

Using 3-D computer animations, the video depicts three hot work accidents: one at Partridge-Raleigh - an oil production site in Central Mississippi; one at the Bethune Waste Water Treatment Plant in Daytona Beach, Florida; and finally one at the Motiva Enterprises Refinery in Delaware City, Delaware.

The video also features an interview with John Capanna, who suffered burns over ninety percent of his body following a hot work accident that occurred while he was performing maintenance activities at a refinery. Mr. Capanna warns, "Don't think that something this tragic couldn't happen to you or somebody you love. This could happen to anybody."

Also featured in the video is Mrs. Casey Jones, the wife of crane operator Mr. Clyde Jones, who was fatally burned at the Bethune Waste Water Treatment Plant in January 2006. Mrs. Jones says, "As a wife, I just assumed that he had a normal, everyday 7:00 to 3:30, Monday through Friday job, safe as my job. I would have never dreamed in a million years he would have been killed in an explosion."

Hot work accidents occur throughout many industries in the U.S., including food processing, pulp and paper manufacturing, oil production, fuel storage, and waste treatment. CSB Investigations' Supervisor Donald Holmstrom states in the video, "We typically hear about hot work accidents weekly. It has become one of the most significant types of incidents the CSB investigates, in terms of deaths, in terms of frequency."

Emphasizing key lessons from the safety bulletin, CSB's Chairman John Bresland states, "Hazard assessments and combustible gas detectors should be routinely used to identify and monitor for flammable atmospheres before and during hot work. Effective gas monitoring will save lives."

The video is available for viewing and downloading on the CSB's website as well as the agency's YouTube channel. Free DVD's can be requested by completing an online request from www.csb.gov.

Reference: www.csb.gov

Unknown Exposure Limits for the Top Chemicals of Concern

By Abdul H. Khalid, Chemical Engineer, HTIS

Each year many workers are exposed to hazardous chemicals that have no permissible exposure limits (PELs). When exposed to such chemicals, workers may suffer injuries and occupational illnesses that can damage lungs, skin, liver, kidneys, eyes, and mucous membranes.

OSHA is responsible for setting and enforcing PELs in order to prevent occupational illnesses and injuries in workers. Most of OSHA's PELs were adopted shortly after the Agency was first established (Dec1970), and have remained unchanged. Meanwhile, science has moved forward, and health data indicate hazards below the levels permitted by many OSHA PELs. Like the occupational health community at large, OSHA realized the inadequacy of many of its PELs, and it is looking for long as well as short term creative solutions to address it.

To resolve this inadequacy, OSHA sought public input to help identify chemicals for which there are concerns, and for which there are no standards or for which the current PELs are inadequate for protecting workers from overexposure. Using an OSHA hosted Web Forum (16-27Aug 2010), stakeholders were presented an opportunity to present their inputs in identifying hazardous chemicals for which the Agency should develop exposure reduction strategies and methods that would lead to reduced worker exposure, and the prevention of occupational illnesses and injuries.

Assistant Secretary of Labor for OSHA David Michaels stated: "we must assure the protection of workers currently exposed to well-recognized chemical hazards for which we have an inadequate PEL or no PEL at all. I am hopeful that this forum will assist us in achieving that goal by helping us to identify those chemicals on which we should be focusing our efforts."

Reference: OSHA Trade News Release, August 16, 2010, http://www.osha.gov.

Snow Cleanup and Post-Storm Hazards

By Beverly Howell, Industrial Hygienist, HTIS

The winter of 2010 was called SnowMagaden because of the series of wild swings and uncommon snowstorms along the East coast and in the Northeast. Traditionally snowstorms of the magnitude seen are not experienced in these areas. A wider population was involved with cleanup and removal of snow including, but not limited to. road and maintenance workers (federal, state and local), employers, employees, and the general public.

The Occupational Safety and Health Administration (OSHA) is ever vigilant in reminding employers, employees and the public of the risk and safeguards associated with the removal of snow. Below is only a snapshot of hazards and solutions.

Common hazards can include:

- Electric shock from contact with downed power lines or the use of ungrounded electrical equipment.
- Falls from snow removal on roofs or while working in aerial lifts or on ladders.
- Being struck or crushed by trees, branches or structures that collapse under the weight of accumulated snow.
- Carbon monoxide poisoning from gasoline-powered generators in inadequately ventilated areas or idling vehicles.
- Lacerations or amputations from unguarded or improperly operated chain saws and power tools, and improperly attempting to clear jams in snow blowers.
- Being struck by motor vehicles while working in roadways.
- Hypothermia or frostbite from exposure to cold temperatures.

Means of addressing these hazards can include:

- Assuming all power lines are energized, keeping your distance and coordinating with the utility.
- Making certain that all electrically powered equipment is grounded.
- Providing and ensuring the use of effective fall protection.
- Properly using and maintaining ladders.
- Using caution around surfaces weighted down by large amounts of snow.
- Making certain all powered equipment is properly guarded and disconnected from power sources before cleaning or performing maintenance.
- Using and wearing eye, face and body protection.
- Clearing walking surfaces of snow and ice, and using salt or equivalent where appropriate.
- Establishing and clearly marking work zones.
- Wearing reflective clothing.
- Using engineering controls, personal protective equipment and safe work practices to reduce the length and severity of exposure to the cold.

Additionally, recent severe storms caused destruction resulting in power outages. The U.S. Consumer Product Safety Commission (CPSC) warns residents of the deadly dangers from portable generators, that are often used to deal with the loss of electricity. Carbon monoxide from generators resulted in at least 70 deaths in 2008.

The CPSC strongly warns consumers to never use a generator indoors – including garages, basements, crawlspaces and sheds – even with ventilation. Exhaust fumes contain extremely high levels of carbon monoxide (CO) that can rapidly become deadly if inhaled.

Consumers should only use a portable generator outdoors in a dry area away from doors, windows and vents that can allow CO to come indoors. Before using a generator, one should wait for the rain to pass since consumer-grade generators are not weatherproof, and can pose the risk of electrocution and shock when used in wet conditions.

Additional life-saving safety tips from CPSC include:

- If you start to feel sick, dizzy or weak while using a generator, get to fresh air right away. The CO from generators can readily lead to full incapacitation and death.
- Do not connect the generator directly into your home's electrical system through a receptacle outlet – this is an extremely dangerous practice that poses a fire hazard and an electrocution hazard to utility workers and neighbors served by the same transformer.
- If using a generator, plug individual appliances into heavy duty, outdoor-rated extension cords and plug cords into the generator.
- Check that the extension cords have a wire gauge adequate for the appliance loads and have all three prongs, including a grounding pin.
- Keep charcoal grills outside. Never use them indoors. Burning charcoal in an enclosed space can produce lethal levels of carbon monoxide poisoning.
- Check to make sure your smoke alarms and carbon monoxide alarms have batteries and are working.

For more information on generators, go to:
http://www.cpsc.gov/generator.html

More information on hazards and safeguards associated with cleanup and recovery activities after a storm or other major weather events is available online in English and Spanish at http://www.osha.gov/OshDoc/hurricaneRecovery.html.

References:

1. OSHA Regional News Release, US Department of Labor, Office of Public Affairs, Region 3, #10-224-NEW/(osha 10-34),Thurs., Feb. 25, 2010, " US Labor Department's OSHA reminds employers of hazards associated with snow cleanup and urges proper worker safeguards".

2. Media Advisory, US Consumer Product Safety Commission, Office of Information and Public Affairs, February 26, 2010 "CSPC Warns of Post-Storm Hazards in the Northeast U.S. from Portable Generators" .

Other News

REACH Regulation has Identification Issues on Different Crystalline Forms of Inorganic Substances

By Abdul H. Khalid, Chemical Engineer, HTIS

In June 2010, the European Chemicals Agency (ECHA) announced the availability of its Practical Guide 11 entitled, "How to address specific substance identification issues" that is now available online at: http://echa.europa.eu/doc/publications/practical_guides/pg_substance_id.pdf.

This document explains how companies can fulfill their legal requirements under the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) regulation (EC No. 1907/2006) and the CLP (classification, labeling, and packaging of substances and mixture). The information in this document provides only technical help, and not legal advice, on how to comply with the legal obligations related to the REACH and the CLP.

This guide makes clear that inorganic substances with the same chemical composition, but different crystalline forms are regarded as different substances under the REACH regulation. Since different crystal forms may exhibit different hazardous properties, the registrant must document each form, and its relevant form-specific properties in the registration and filing document.
The assessment of substance identity is part of the evaluation process carried out by ECHA after registration. The brief advice presented in the Practical Guide explains the approach ECHA will adopt in evaluating the identity of inorganic substances, thus helping potential registrants to prepare their registration documentary records or files.

ECHA will update this Practical Guide whenever it becomes aware of issues related to this subject.

For further information, visit the ECHA website at:
http://echa.europa.eu/home_en.asp

Reference: News Alert, June 22, 2010. "New practical guide on how to address specific substance identification issues: evaluation of different crystalline forms".

Bed Bugs
— Just the Facts

The resurgence of "bed bugs" in the US has been in the media lately. In January 2010, the U.S. Army Public Health Command published a two page "fact sheet" on Bed Bugs in which the following questions are asked and answered.

1. What are bed bugs?
2. Should I be concerned about bed bugs bites?
3. Is there more than one type of bed bug that will bite humans?
4. How do bed bugs get into dwellings?
5. What are the things I can do to prevent bed bugs from getting into my house or quarters?
6. What do I look for when I suspect a bed bug infestation?
7. What can I do to get rid of bed bugs in my home or quarters?
8. Where can I get more information on bed bugs?.

This fact sheet is available at: http://phc.amedd.army.mil/phc%20resource%20library/bedbugsjustthefactsjan2010.pdf

This bulletin is printed on RECYCLED PAPER

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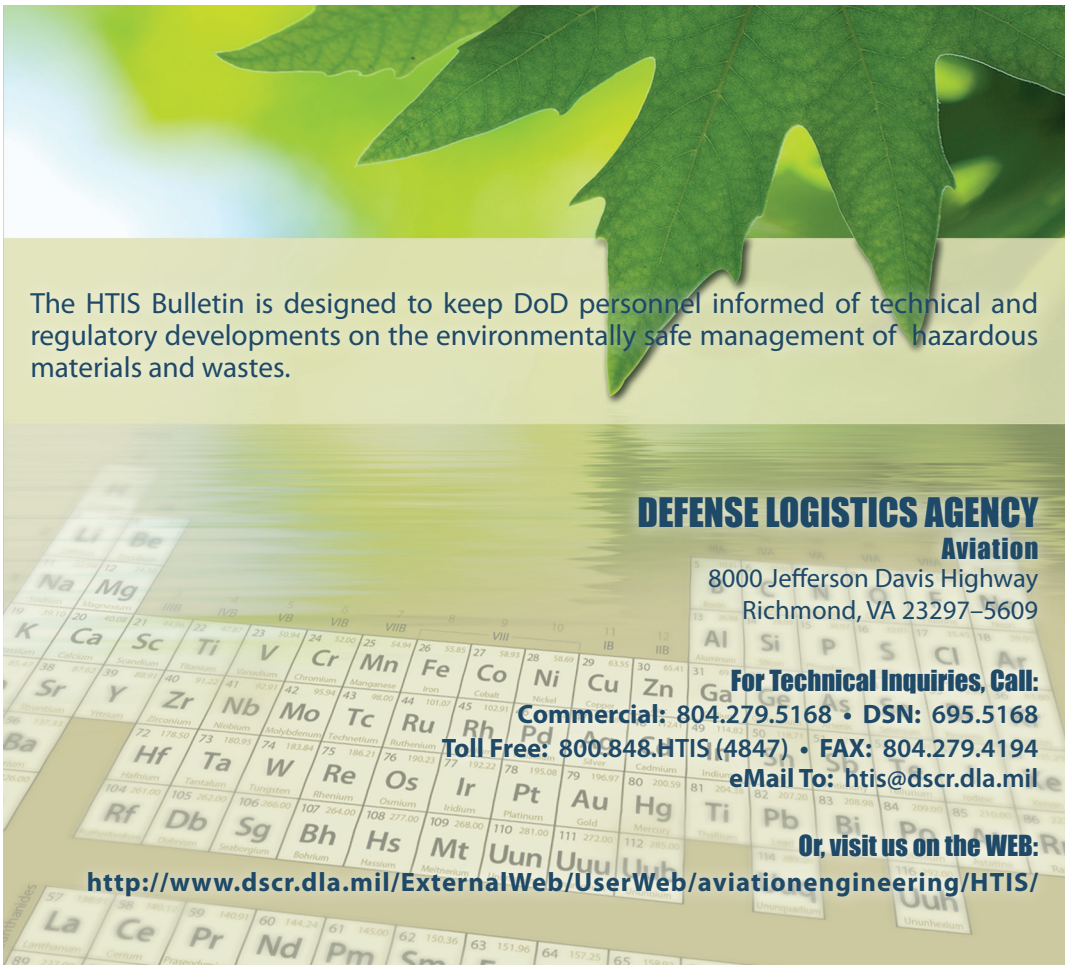
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