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Eye on Safety

Inside this issue:

Dipping and coating have unique hazards 1

Safety focus: Safe work practices around electricity 3

Avoiding the flu..... 4

National Institutes of Health Office of Research Services Division of Occupational Health and Safety

Providing a safe and healthy environment for employees, patients and visitors.

“Safe science and good science go hand-in-hand.”

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Dipping and coating have unique hazards

Painting, plating, stripping, and cleaning are essential operations in many workplaces. Make sure you are prepared for these jobs.

What are dipping and coating operations?

Dipping and coating operations involve the use of chemicals. OSHA addresses the hazards of dipping and coating operations in the rules at §§1910.122–126. These standards are designed to protect employees from toxic exposures, fire, and other hazards.

The OSHA standards apply when you use a dip tank containing a liquid other than water. It applies when you use the liquid in the tank or its vapor to:

- Clean an object;
- Coat an object;
- Alter the surface of an object; or
- Change the character of an object.



The rule also applies to draining or drying operations. It does not apply when the operation uses a molten material.

Some examples of operations that use dip tanks include:

- Paint dipping;
- Electroplating;
- Pickling;
- Quenching;
- Tanning;
- Degreasing;
- Stripping;
- Cleaning; and
- Roll coating, flow coating, and curtain coating.

The hazards

During dipping and coating operations, parts or other items are typically put into a tank for treatment. As items enter and leave the liquids in the tanks, there is a potential for splashing, dripping, or spattering. The liquids may present health hazards.

Sometimes liquids in a tank are heated to high temperatures. Handling items during the job may cause splashes. You may be at risk for chemical or thermal burns.

You can learn about the hazards by reading the chemical's safety data sheet (SDS). Take precautions to protect yourself from direct contact and from the inhalation of harmful vapors.

(continued on page 2)

Dipping and coating have unique hazards *(continued from page 1)*

Another hazard is the slipping/falling hazard that comes from working in an area with the potential for wet floors. Mats, grating, and slip resistant footwear help reduce the risk of injury.

When flammable liquids are used, there's the potential for fires. Fire extinguishing systems and other specialized equipment must be installed for fire protection. Portable fire extinguishers must be available.

PPE and ventilation

Personal protective equipment (PPE), covers, and ventilation equipment can help you avoid hazards.



Eye and face protection is needed when you are exposed to chemical splash hazards. Goggles fit close to the eyes and provide the best protection from splashes. A face shield worn over eye protection provides additional protection for the face.

Rubber gloves protect the hands from hazardous liquids and vapors. Rubber gloves are selected for their chemical resistance to the liquid used in the process.

If you need to reach into the liquid, make sure the gloves are long enough to keep the liquid from getting into the glove. **Foot protection**, including the use of rubber boots, may be required.

You might also need to wear **aprons, coveralls, or other types of chemical-resistant clothing**.

Ventilation systems help remove harmful vapors from the work area. However, back-up procedures, including the use of respirators, must be in place in case the ventilation system fails. **Atmosphere-supplying respirators** are required if there's an oxygen-deficient atmosphere (oxygen levels are below 19.5 percent).

All types of PPE have some limitations that you should be aware of. Use the right type of PPE for the job, and make sure it's in good condition. Damaged PPE doesn't give you the same amount of protection.

Emergency Procedures

You must know the first aid procedures appropriate for the hazards to which you are exposed. If you're expected to respond to emergencies such as spills or fires, you'll need specialized equipment and training. Everyone should

know how to evacuate the area and call for emergency responders in case of an emergency.

To help prevent fires, keep the area clean. Contaminated rags and other materials must be placed in approved waste cans immediately after use, and the contents of the waste cans are to be properly disposed of at the end of each shift. Don't smoke in the tank's vapor area.

Maintenance operations involving entry into a tank

You may need to enter the dip tank for cleaning, inspection, or repair jobs. Even when the liquid is drained from the tank, the entry operations can still be hazardous.

When a dip tank meets the definition of a permit-required confined space (see 1910.146), all of the provisions of an entry permit must be in place before anyone can go into the tank. Employees on the entry team must have the proper training.



An example of a dipping and coating accident from OSHA

A maintenance worker at a company in Nebraska jumped into a tank containing 18,000 gallons of potassium hydroxide. The tank was part of a 13-tank dip tank system used in the manufacture of heavy farm machinery.

An unguarded, elevated catwalk ran between two of the 18,000-gallon tanks. The tanks were serviced by an overhead crane that moved parts in and out of the tanks. As the crane traversed the catwalk in its lowered position, there were only a few inches of clearance between the crane mechanism and the catwalk.

The worker had to make an adjustment to a spray nozzle on one of the tanks. He thought he had enough time to run out on the catwalk and make the repair before the crane traversed the catwalk again. While making the repair, he turned around and saw that the crane was upon him. He had only a split second to decide what to do. He later said that he felt his only recourse was to jump into the tank in order to avoid being struck and pinned by the crane. He survived, but was hospitalized with chemical burns.

Safety focus: Safe work practices around electricity

Electricity is such an integral part of our lives at home and in the workplace that we tend to take its power for granted. But a sobering fact is that hundreds of workers are electrocuted each year. Electrical accidents in the workplace can, for the most part, be avoided if you use safe electrical equipment and work practices.

What are the hazards of electricity?

The primary hazards of electricity and its use are shock, burns, arc-blast, explosions, and fire.

Electric currents travel in closed circuits through some kind of conducting material. You get a shock when some part of your body becomes part of an electric circuit. High-voltage shocks can cause serious injury (especially burns) or death. The severity of the shock a person receives depends on the amount and the path of the electric current flowing through the body, as well as how much time elapses while the body is part of the electric circuit. A current as small as 60/1000 of an ampere can kill you if it passes through your chest. The typical household current operates at 15 amperes. Burns can result when a person touches electrical wiring or equipment that is improperly used or maintained. Typically, such burn injuries occur on the hands.



Electricity is one of the most common causes of fire both in the home and workplace. Defective or misused electrical equipment is a major cause, with high resistance connections being one of the primary sources of ignition.

Avoiding electrical accidents

It is important for you to understand how to avoid electrical hazards when you work with electrical power tools, maintain electrical equipment, or install equipment for electrical operation. Accidents and injuries resulting from working with electricity are caused by one or a combination of the following factors:

- Unsafe equipment and/or installation;
- Unsafe workplaces caused by environmental factors; and
- Unsafe work practices.

Protective methods to control electrical hazards include:

- **Insulation.** Insulators of glass, mica, rubber, or plastic are put on electrical conductors to protect you from electrical hazards. Inspect the insulation on electrical cords to be sure there are no exposed electrical wires before using electrical equipment.
- **Electrical protective devices.** Electrical protective devices, including fuses, circuit breakers, and ground-fault circuit-interrupters (GFCIs) interrupt current flow when it exceeds the capacity of the conductor. They

are critically important and should be installed where necessary.

- **Guarding.** Any live parts of electrical equipment operating at 50 volts or more must be guarded to avoid accidental contact.
- **Grounding.** Grounding is necessary to protect you from electrical shock, safeguard against fire, and protect against damage to electrical equipment. Grounding includes electrical circuit or system grounding, accomplished when one conductor of the circuit is intentionally connected to earth, and electrical equipment grounding, which is when the equipment grounding conductor provides a path for dangerous fault current to return to the system ground at the supply source of the circuit should the insulation fail. An example would be the ground prong in a plug.
- **PPE.** You must use electrical protective equipment appropriate for the work.

Work at working safely

Safety should be foremost in your mind when working with electrical equipment. Follow these general rules:

- Regularly inspect tools, cords, grounds, and accessories. Arrange for repair or replacement immediately.
- Install or repair tools and equipment only if you're qualified and authorized to do so. A faulty job may cause a fire or seriously injure you or other workers.
- Be sure you use safety features like three-prong plugs, double-insulated tools, and safety switches. Be sure electrical covers and panels are in place.
- Keep electric cables and cords clean and free from kinks. Never carry equipment by its cords.
- Use extension cords only when flexibility is necessary. Never use them as substitutes for fixed wiring.
- Never run extension cords through holes in walls, ceilings, floors, doorways, or windows. Never use extension cords where they are concealed in such a manner.
- Don't touch water, damp surfaces, ungrounded metal, or any bare wires if you are not protected.
- Don't wear metal objects (rings, watches, etc.) when working with electricity. They might cause arcing.
- If you are working near overhead power lines of 50 kilovolts (kV) or less, you or any equipment you are using must not come any closer than 10 ft from the lines. Add 4 inches of distance for every 10 kV over 50 kV.

Good work habits soon become second nature. Treat electricity with the respect it deserves.

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Avoiding the flu

"We are what we repeatedly do. Excellence, then, is not an act, but a habit."

By
Aristotle
121 AD - 180 AD



Washing your hands often can help you avoid contracting the flu.

The flu is a contagious respiratory illness caused by influenza viruses that infect the nose, throat, and sometimes the lungs. It can cause mild to severe illness, and at times can lead to death. The best way to prevent the flu is by getting a flu vaccine each year.

Flu viruses typically come on more suddenly than colds and arrive with more severe symptoms. A cold rarely comes with a fever of more than 101 degrees, and usually disappears on its own within a week.

People who have the flu often feel some or all of these signs and symptoms:

- Fever or feeling feverish/chills (however, not everyone with the flu will have a fever);
- Cough;
- Sore throat;
- Runny or stuffy nose;
- Muscle or body aches;
- Headaches;
- Fatigue (very tired); and
- Vomiting and diarrhea in some people, although this is more common in young children than in adults



People with the flu can spread it to others up to about 6 feet away. Most experts think that flu viruses are spread mainly by droplets made when people with the flu cough, sneeze, or talk. These droplets can land in the

mouths or noses of people who are nearby. Less often, a person might also get flu by touching a surface or object that has flu virus on it and then touching their own mouth or nose.

To avoid contracting the flu, it is important to wash your hands often with soap and water for at least 20 seconds. If soap and water are not available, use an alcohol-based hand rub. Even if you think you can tough it out, severe or persistent flu symptoms (like a prolonged high fever or severe exhaustion) merit a doctor's visit to determine the best course of treatment.

There are prescription medications called "antiviral drugs" that can be used to treat flu illness. Antiviral drugs are prescription medicines (pills, liquid, an inhaled powder, or an intravenous solution) that fight against the flu virus in your body. Tamiflu® is an example. Antiviral drugs are not sold over the counter. You can only get them if you have a prescription. Antiviral drugs are different from antibiotics, which fight against bacterial infections.

Studies show that flu antiviral drugs work best for treatments when they are started within 2 days of getting sick. However, starting them later can still be helpful, especially if the sick person has a high-risk health condition or is very sick from the flu. Follow your doctor's instructions for taking these drugs.