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Eye on Safety

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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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Know the hazards of corrosives

Corrosive chemicals are safe to use when you understand their hazards and how to protect yourself. Corrosives can cause:

- Burns and irritation;
- Poisoning;
- Property damage;
- Fires; and
- Oxidation reactions.

Here are some examples of common acids:

- Sulfuric acid — battery acid, drain opener, or cleaner;
- Acetic acid — contained in vinegar;
- Hydrochloric acid — used for treating and pickling metal;
- Nitric acid — also an oxidizing agent; and
- Hydrofluoric acid — a very strong acid that can be used to etch glass.

Here are some examples of common bases:

- Ammonium hydroxide — contained in household ammonia products;
- Potassium hydroxide (potash) — used to manufacture soaps and batteries;
- Sodium hydroxide (lye) — used to manufacture paper, detergents, and oven cleaners;

- Calcium hydroxide (hydrated lime) — used in cement, metalworking fluids, and water-based paints; and
- Sodium carbonate (soda ash) — used as a water softener, cleaner, and for glass manufacture.

How to recognize corrosives

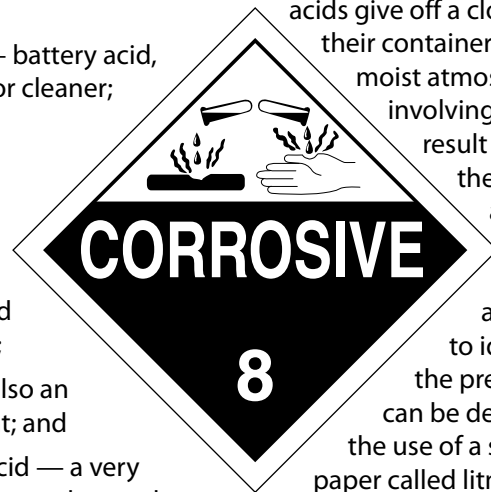
Corrosives can be liquids, powders, pellets, or gases. Most have a strong, irritating odor. Some liquid strong acids give off a cloud-like fume when their containers are opened in a moist atmosphere. Reactions involving corrosives can result in spattering or the creation of heat and fumes. While it is always important to read a container's label to identify a substance, the presence of a corrosive can be determined through the use of a specially treated paper called litmus paper. Litmus paper turns red in the presence of an acid. It turns blue in the presence of a base.

In general, the pH scale indicates the strength of acids and bases, with a value of 7 being neutral. A value of 1 is a strong acid, and a value of 14 is a strong base.

Health hazards of corrosives

Some corrosives, especially acids, will cause a burning, irritating sensation, and some may be very painful. But,

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Know the hazards of corrosives *(continued from page 1)*

some corrosives may not cause any immediate pain. When a base comes in contact with your skin, you may feel a slippery sensation.

A worst-case example is skin contact with hydrofluoric acid. Contact may not hurt right away, but if you don't get immediate medical treatment, tissue and bone damage will result — and other complications can lead to a critical condition.

The mucous membranes of your eyes, nose, and mouth are targets for irritation and burning from contact with corrosives. As the mucous membrane linings of the nose, throat, and respiratory tract are irritated or burned from corrosive gases, fumes, or mists, the body produces fluids to try to protect the tissue. This can lead to a build-up of fluid in the lungs (pulmonary edema), a life-threatening condition.

Many corrosives are toxic (poisonous). Overexposure to toxic or highly toxic corrosives requires immediate medical attention.

Refer to the product's SDS for first aid and emergency information. In general, if workers are overexposed to corrosive gases, vapors, fumes, or mists, they must be removed to an area with fresh air and get medical attention.

In case of direct contact with a corrosive, a common first aid treatment is to immediately flush the affected area with plenty of clean water for at least 15 minutes. Then get medical attention.

Physical hazards of corrosives

Corrosives react with many materials, and some of these reactions can be violent, generate heat, cause explosions, or cause enough pressure build-up in a container to make it rupture. Many corrosives react with water.

Many corrosives are also flammable. Explosive and highly-flammable hydrogen gas is produced when acids react with metals.

Some corrosives are also oxidizers. When oxidizers are involved in a chemical reaction, oxygen is released. This greatly increases the flammability hazard. Oxidizers initiate or promote combustion in other materials. Nitric, chromic, and perchloric acids are examples of corrosives that are also oxidizers.

Safe storage

Store corrosives in their original containers. If a corrosive must be transferred to another container, make sure it is clean and corrosion resistant. Corrosives may need to be stored separately from other materials. Be sure to return containers to the proper place after use.

Storage areas should be well-ventilated. Shelving and other storage materials should be made of materials that will resist corrosion, such as wood or plastic.

Rough handling can damage, dent, or crack containers and lead to dangerous leaks. Inspect containers for damage prior to use. If the container is damaged, or if the contents appear to be discolored or contaminated, the corrosive may not be safe to use.

Promptly report suspected damage, contamination, or leaks.

Use safe work practices when using corrosives

- 1. Review the product's safety data sheet (SDS).** The SDS contains critical information for handling chemicals.
- 2. Practice fire safety.** Remove combustible materials (such as rags, papers, or cardboard) and ignition sources from the work area, use adequate ventilation, know how to report a fire, and make sure fire-fighting equipment is in place.
- 3. Use Personal Protective Equipment.**
 - Wear chemical splash goggles and chemical-resistant gloves as minimum protection. Depending on the job, you could need to add a faceshield, chemical-resistant coveralls or an apron, chemical-resistant shoe or boot covers, or a respirator.
 - Do not touch any exposed skin or clothing with potentially contaminated PPE while you work and when you remove the PPE.
- 4. Practice Safe Handling.**
 - Remove all jewelry before you work with corrosives. Corrosives, especially strong acids, react with metal. The chemicals can get trapped under or within jewelry to prolong hazardous skin contact.
 - Take out only the amount of corrosive that you need for the job. Returning contaminated corrosive to its original container can cause a dangerous chemical reaction.
 - When mixing a corrosive with water, always add the corrosive to the water. (Use the acronym "AAA" or "Always Add Acid" to help you remember.
 - Wash hands and any other exposed skin after using corrosives.
- 5. Dispose of properly.** Never pour waste corrosives down a drain or toss them in the regular trash. These hazardous chemicals need to be collected for proper treatment and disposal.



Safety focus: Winter defensive driving

Many parts of the country have already been blasted with winter weather this season. The weather can catch many of us off-guard. Here are a few reminders about driving defensively in ice, snow, and slippery conditions.

Operating hazards

There are two main hazards when driving in adverse winter weather conditions — reduced visibility and reduced traction.

1. **Reduced visibility.** When snow and ice build up on your vehicle's lights, windows, and mirrors, visibility is reduced in all directions (front, side, and rear).

If operating properly, your vehicle's defroster and windshield wipers will keep the windshield clean and clear. However, you will need to stop to clean off the side windows and mirrors. Never drive if you cannot see in all directions. Remember that snow, ice, and dirt can build up on your vehicle's lights. This reduces your visibility and the ability of other drivers to see your vehicle. So keep them clean!

2. **Reduced traction.** Different surfaces have different amounts of traction. For example, a snow-packed or ice-covered surface will have only one-fifth (20 percent) of the traction that the same surface does when it's wet. Traction is needed for accelerating, turning, and braking. As vehicle speed increases, more traction is needed. If traction is poor, you must reduce your speed. On a wet surface, you may need to reduce your speed by one-fourth or more. For example, if you normally travel at 65 mph on a stretch of road, you will need to reduce your speed to about 45-48 mph. As a general rule, you can drive about one-half your normal speed on packed snow. If you usually travel at 65 mph, you should cut your speed to about 30-32 mph.

Black ice

Black ice is one of the most dangerous road conditions, as most drivers aren't aware of black ice until it is too late. Black ice forms when temperatures drop rapidly and hover around the freezing mark (32°F). Any moisture on the road freezes into a smooth, nearly invisible, slippery surface. On cold days, when the road is wet, pay extra attention to the spray thrown from other vehicles. If the spray suddenly stops, black ice may be forming. You can also feel for ice formation on the front of your outside mirror.

The most common places for black ice to form include:

- On bridges;
- On underpasses;
- Dips in the road where water can collect and freeze;
- Shaded areas; and

- The lower side of banked curves.

Emergency preparation

Keep some emergency supplies in your vehicle in the event you may become trapped in bad weather. This includes a

flashlight, jumper cables, abrasive material (like sand or kitty litter), shovel, snow brush, ice scraper, warning devices (like flares), and blankets. For long trips, add food and water, medication, and a cell phone. You may also want to keep a coffee can filled with items such as a candle, matches, gloves, hat, socks, a pocket knife, trash bag, and some bright cloth

to tie to the outside of your car. If trapped, you can use the candle to melt snow in the can for drinking water. Do not run your car unless you are sure the exhaust pipe is clear.

Safe cold weather driving tips

- Know the current road conditions before departing. Check your state's highway conditions and be aware of the expected weather where you are traveling so that you can be prepared.
- Look well ahead. This can alert you to problems and give you a little extra time to react safely.
- Maneuver slowly on the ice or snow. Do not brake, accelerate, or steer quickly. Take turns and curves slowly.
- Use brakes carefully. Brake early and allow more time to stop. Know what type of brakes your vehicle has. You should stomp on antilock brakes, but pump non-antilock brakes.
- Steer into a skid. If you enter an icy turn too quickly and step on the brakes, your front tires might grip the road, but your rear tires might lose their grip causing your vehicle's rear to swing outward, the opposite direction from where you are turning. By steering in the direction your rear tires are skidding, you allow your car to come out of the skid.
- Don't use your cruise control in wintry conditions. Applying your brakes to deactivate your cruise control can cause you to lose control.
- Leave room for maintenance vehicles and plows. Always slow down or move over when approaching emergency or maintenance vehicles parked on the side of the road when they have their flashing lights turned on. Stay back at least 200 feet from snow plows (it's the law!), and don't pass on the right. Avoid making an abrupt lane change around plows. The other lane might not be cleared and be more dangerous for travel.
- Slow down! Allow for extra time to reach your destination safely.



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Are you a worrier?

"Most folks are as happy as they make up their minds to be."

Abraham Lincoln



Are you a worrier?

Good mental and emotional health isn't just the absence of a serious condition — it also has to do with a person's ability to enjoy life. People who are emotionally and mentally healthy generally feel content and are able to relax and have fun. But if you're a regular worrier, these concepts may not be familiar to you. Why? Because constant worrying takes energy and time that you could be using in a more positive way.

In some cases, brief bouts of worrying can be productive — especially if it prompts you to address a manageable problem. But if you're worrying about something that could happen over which you have no real influence, worrying isn't likely to be constructive at all.

People who are chronic worriers often have a difficult time dealing with uncertainty in their lives. They want to know the outcome of every action or event. They feel that they are better prepared if they worry about what will happen and won't be surprised. Habitual worriers may think that the practice will help them find a solution to a problem or be prepared for any outcome.

In fact, they often feel that pouring over what might happen will protect them in some way. But most of the time, worrying just creates unnecessary stress and takes away from the time individuals have to enjoy what's going on around them.

If worrying is negatively affecting you, step back and think about whether or not it's truly



doing you any good. Could you be using your time more wisely? Do you have the ability to deal with a negative situation even if you hadn't anticipated it? Is there a more realistic, balanced way of looking at the situation? Can you accept the fact that you can't know all the answers now and worrying won't provide you with the answers that you want?

It's tough for chronic worriers to stop worrying altogether, but this type of behavior won't keep bad things from happening. If you recognize the need to reduce this kind of angst in your life, start by limiting the amount of time you allow yourself to worry. Take note of what you're gaining by limiting this time. What you notice may make it easier to continue to worry less in the future.