



*"Safety Comes First"*

# Case Western Reserve University Environmental Health and Safety

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*In this issue:*

## *Protecting Yourself From Chemical Splashes*

<i>Protecting Yourself From Chemical Splashes</i>	1	Eye exposure to hazardous chemicals can cause permanent blindness, as well as other damage or irritation to the eyes, and eye and face protective devices are critical to preventing this exposure. The following protection devices should be used while working with hazardous chemicals:
<i>Dangers of Common Cleaning Products</i>	2	<ul style="list-style-type: none"> <li>• Goggles with indirect ventilation (both the eyecup and the cover type),</li> <li>• A face shield to be worn over spectacles or goggles, and/or</li> <li>• A full-facepiece respirator.</li> </ul>
<i>Foot Protection Choosing The Right Type</i>	5	You'll be provided with a protector appropriate for the particular job you'll be doing. If there's a potential for a chemical splash, you'll most likely be provided with safety goggles.
<i>Struck-By Hazards</i>	6	Additionally, if you're working with highly hazardous chemicals, such as acids, you may also be required to wear a face shield over your safety goggles. When you receive your protective device, check it to make certain it has a "D3" marking along with the manufacturer mark on it, meaning the device meets the requirements of American National Standards Institute (ANSI) Z87.1 for protection from droplets or splashes. It may also have a "+" sign to indicate it's impact-rated, which protects you in the event of an accidental chemical explosion. Eye and face protection devices must be properly maintained. Be sure to:
<i>Chemical Spotlight: Mesityl Oxide</i>	7	<ul style="list-style-type: none"> <li>• Check for cracks in lenses or face shields, and replace if necessary. Also, look for scratches that may prevent you from seeing clearly.</li> <li>• Check frames and nosepieces to make sure they aren't warped or cracked.</li> </ul>
<i>Fun Page</i>	8	<ul style="list-style-type: none"> <li>• Make sure straps used to secure your eyewear aren't worn or broken or overly stretched out.</li> </ul>
<i>Staff</i>	9	<ul style="list-style-type: none"> <li>• Finally, fit-test your eyewear before each use.</li> </ul>
2024-3		Source: Safety BLR

## Dangers Of Common Cleaning Products



*“Bleach  
and  
Ammonia  
Produces  
chlora-  
mine gas.”*

Cleaning products are essential for maintaining hygiene in our living environments, but it's crucial to recognize that improper use of these chemicals can be harmful. While exposure to cleaning products alone is generally not hazardous, mixing incompatible chemicals can lead to dangerous reactions that amplify the risk of exposure, potentially causing severe health issues or even death. Here are ten combinations to avoid:

Here's a list of dangerous reactions that can occur when household cleaning products are mixed, along with their harmful effects. This is nowhere near a comprehensive list and the mixing of cleaning products in general should be avoided.

1. **Bleach and Ammonia:** Produces chloramine gas, causing respiratory issues, chest pain, and irritation to the mucous membranes.
2. **Bleach and Vinegar:** Creates chlorine gas, leading to coughing, breathing difficulties, and chemical burns.
3. **Hydrogen Peroxide and Vinegar:** Results in peracetic acid, which is corrosive and harmful to the eyes, skin, and respiratory system.
4. **Bleach and Rubbing Alcohol:** Produces chloroform, hydrochloric acid, and chloroacetone, damaging the nervous system, lungs, liver, kidneys, and causing eye and skin irritation.
5. **Bleach and Glass Cleaner (Ammonia-based):** Produces chloramine vapors, causing respiratory irritation, chest pain, and harm to mucous membranes.
6. **Drain Cleaner and Bleach:** Produces chlorine gas, which is highly toxic and can cause severe respiratory issues and damage to mucous membranes.
7. **Two Different Drain Cleaners:** Mixing can lead to violent reactions, potentially releasing toxic gases or causing explosions.
8. **Bleach and Toilet Bowl Cleaner:** Also produces chlorine gas, leading to burning sensations in the eyes, nose, throat, and respiratory issues.
9. **Mildew Stain Remover and Bleach:** Both often contain bleach but can include other chemicals that react with additional bleach, increasing the concentration of chlorine gas produced.

**Bleach and Oven Cleaner:** When bleach is mixed with oven cleaners, it can produce chlorine and chloramine gases. These gases can cause severe respiratory distress, chest pain, and irritation to the eyes, throat, and lungs. This reaction is similar to other bleach-involved reactions but may be exacerbated by the strong alkaline chemicals found in many oven cleaners.

### Cleaning products that on their own may release toxic fumes

**TARN-X:** The reaction of TARN-x With Silver Corrosion can release Hydrogen Sulfide. The reaction amount should be small but very good ventilation should be used with this product.

*(Continued on page 3)*

## *Dangers Of Common Cleaning Products, Cont.*

*(Continued from page 2)*

The risk is higher if you are working in close on an object. Use good ventilation and do not place your face near the object or cleaning solution.

**Bleach** releases chlorine and chloramines into the air, which is why it's essential to use it in well-ventilated areas. The odor threshold for chlorine, where it becomes detectable by smell, is 0.1-0.3 ppm. Notably, if you can smell bleach, you are likely approaching the OSHA Permissible Exposure Limit (PEL) of 0.5 ppm for chlorine. This PEL is the recommended maximum exposure for an 8-hour work shift. Additionally, the peak exposure limit for chlorine is 3 ppm, which should not be exceeded for more than five minutes at any time. If you smell bleach take steps to reduce exposure and to increase ventilation when possible.

- **Ventilation:** Always use bleach in a well-ventilated area to help disperse the fumes. Open windows and doors, or use fans to circulate air and reduce the concentration of chlorine gas. If a strong odor of bleach is present contact CWRU EHS for monitoring to assure proper ventilation is present and leave the area and let it ventilate.
- **Exposure Limits:** The smell of bleach alone does not necessarily mean that it is at unsafe levels, but it's a good indicator that you should ensure better ventilation. Continual exposure, even to low levels of chlorine gas that you can smell, can be irritating to the respiratory system, eyes, and skin.
- **Protective Measures:** Wear gloves and, if possible, eye protection when using bleach, especially when diluting or mixing it for cleaning. This can prevent skin contact and splash injuries to your eyes.
- **Follow Instructions:** Always follow the usage and dilution instructions on the bleach container. **Never mix bleach with ammonia or acids, as this can produce highly toxic gases.**
- **Monitor for Symptoms:** If you or others begin to experience symptoms such as coughing, throat irritation, breathing difficulties, or watering eyes while using bleach, leave the area immediately to get fresh air and consider reducing the amount of bleach used or employing additional ventilation. Seek the advise of the CWRU EHS group before continuing.

**Ammonia** releases fumes that can be harmful when inhaled, making it crucial to use it in well-ventilated areas. The odor threshold for ammonia, where it becomes detectable by smell, is around 5 ppm. Notably, if you can smell ammonia, you are likely approaching the OSHA Permissible Exposure Limit (PEL) of 25 ppm for ammonia. This PEL is the recommended maximum exposure for an 8-hour work shift. Additionally, the short-term exposure limit (STEL) for ammonia is 35 ppm, which should not be exceeded for more than 15 minutes at any time. If you smell ammonia, take steps to reduce exposure and increase ventilation when possible.

*(Continued on page 4)*

*“Ammonia releases fumes that can be harmful when inhaled, making it crucial to use it in well-ventilated areas.”*

## Dangers Of Common Cleaning Products, Cont.

*“Hand Sanitizers normally contain more than 60% alcohol. This amounts to 120 proof, more than most commercial liquors!”*

*(Continued from page 3)*

- **Ventilation:** Always use ammonia in a well-ventilated area to help disperse the fumes. Open windows and doors, or use fans to circulate air and reduce the concentration of ammonia gas. If a strong odor of ammonia is present, contact CWRU EHS for monitoring to ensure proper ventilation and leave the area to let it ventilate.
- **Exposure Limits:** The smell of ammonia alone does not necessarily mean that it is at unsafe levels, but it's a good indicator that you should ensure better ventilation. Continual exposure, even to low levels of ammonia gas that you can smell, can be irritating to the respiratory system, eyes, and skin.
- **Protective Measures:** Wear gloves and, if possible, eye protection when using ammonia, especially when diluting or mixing it for cleaning. This can prevent skin contact and splash injuries to your eyes.
- **Follow Instructions:** Always follow the usage and dilution instructions on the ammonia container. Never mix ammonia with bleach or acids, as this can produce highly toxic gases.

### **Other Products: Include:**

- **Antibacterial Cleaner:** Antibacterial cleaners usually contain water, a fragrance, a surfactant (to break up dirt) and a pesticide. The pesticides commonly used in antibacterial cleaners are quaternary ammonium or phenolic chemicals. Antibacterial cleaners can irritate your eyes and burn your skin and throat.
- **Laundry and Dishwashing Detergents:** Laundry detergent pods may look like colorful pieces of candy, but there's nothing sugary sweet in these products. They contain enzymes — as noted by the names “cationic,” “anionic” or “non-ionic” on the label — to loosen stains and ground-in dirt. Cationic detergents are the most toxic when taken internally and can result in nausea, vomiting, shock, convulsions or coma. “Non-ionic” detergents are less toxic but can irritate skin and eyes. **One last note:** Asthma can develop if a person is exposed to large quantities of detergent. Dishwashing detergents contain phosphate. Automatic dishwashing detergents are known to produce skin irritations or burns and may be poisonous if swallowed.
- **Hand Sanitizers:** These normally contain more than 60% alcohol. This amounts to 120 proof, more than most commercial liquors! And yes, this is most often times available to children. This is dangerous enough if it contains ethanol, or ethyl alcohol. It's even worse if it contains isopropanol, or “rubbing alcohol. This is almost twice as potent and can lead to alcohol poisoning in small doses.

**Monitor for Symptoms:** If you or others begin to experience symptoms such as coughing, throat irritation, breathing difficulties, or watering eyes while using ammonia, leave the area immediately to get fresh air and consider reducing the amount of ammonia used or employing additional ventilation. Seek the advice of the CWRU EHS group before continuing.



## *Foot Protection – Choosing The Right Type*

The right kind of foot protection depends on the types of hazards you're exposed to at work. The following are some common types of foot hazards and the best type of protective footwear to guard against these hazards.

**Falling Objects**—To protect against falling objects that could injure you if they land on your feet, choose shoes with steel toes or toe caps made out of hard composite plastic. If your exposure to falling object hazards is only occasional, you can use a strap-on toe guard during these tasks instead of wearing shoes with built-in toe protection.

**Rolling Objects**—If you're exposed to heavy rolling objects that could crush your feet, select footwear with good ankle protection. This is important when you're working with carts, pallet jacks, dollies, or any other item on wheels that could bang into an ankle or catch your heel and cause an injury. Some footwear will have a steel shank in the heel to protect the heel and Achilles tendon from rolling objects, while other types have steel shanks going up the sides of the ankles to prevent the ankles from being twisted or damaged by rolling objects. You can protect your entire foot, not just your toes, from falling and rolling objects if you select shoes with metatarsal protection or use strap-on metatarsal guards made of aluminum or high-density plastic.

**Sharp Objects**—To prevent puncture wounds from sharp objects such as metal chips, nails, or screws, choose puncture-resistant shoes. These have soles that are made of hard, dense materials. Some have steel shanks in the soles that prevent sharp objects from piercing through to the foot.

**Electrical Hazards**—If your job requires you to work around live electrical components and conductors, wear nonconductive shoes. Nonconductive footwear is designed to reduce the potential for electric shock. The soles can typically be exposed to up to 600 volts in dry conditions while still protecting you from hazardous electrical energy.

**Chemical Hazards**—If you work around liquid chemicals, acids, or caustic liquids, you should wear chemical-resistant boots. These boots can be made of rubber, polyvinyl chloride (PVC), neoprene, or vinyl. The best choice of material for the boots depends on the specific chemicals you work with. Check the safety data sheet (SDS) to find out what materials will work best.

**Slippery Walking Surfaces**—If your workplace has slippery surfaces, wear slip-resistant shoes. These have soft rubber soles that grip the surface of the floor and have treads with channels that carry water, oil, chemicals, or other materials out from under the shoe. Even if you're wearing slip-resistant shoes, it's still very important to walk carefully in slippery areas to avoid falling. In wet or muddy conditions, wear waterproof boots to keep your feet dry. Basic rain boots made of PVC or rubber will work in these situations. Cold conditions. In cold conditions, you need footwear with insulated liners to keep your feet warm. If your feet could be exposed to moisture and cold, select footwear that's also waterproof.

*“If your job requires you to work around live electrical components and conductors, wear nonconductive shoes.”*



## Struck-By Hazards



*“Never exceed a device’s lift capacity.”*

### ***Vehicles***

According to OSHA, 75 percent of deaths from struck-by incidents involve heavy equipment. If you work around heavy equipment, you are at risk of being struck by moving objects (such as a backhoe arm) or becoming pinned against an immovable object, like a wall. In addition, you can be struck or crushed by trucks on the jobsite. Here are some ways to avoid these hazards:

- Inspect all vehicles before operating them; only drive a vehicle that is in good working condition and wear a seat belt.
- Always use parking brakes when parked. When parked on an incline, also chock the wheels.
- To prevent a vehicle from rolling over, only drive on roads or grades that are properly maintained. Excavations should be properly barricaded to prevent a vehicle from falling in.
- When backing up a vehicle, if you can’t see behind the vehicle, make sure there is an audible reverse alarm. Another worker, standing at a safe distance, should signal you that it is safe to move.
- Make sure no one is in the area where you will use dumping or lifting devices, and never exceed a vehicle’s rated load or lift capacity. Never operate a forklift if you are not trained and certified to do so.

### ***Falling/flying objects***

Falling objects hazards are common at construction sites, especially beneath cranes, scaffolds, and where work is being performed overhead. You may also be struck by a flying object if activity causes an object to become airborne, such as when using tools and machines or using compressed air. Here are some ways to reduce the risk of injury from these hazards:

- Wear the proper personal protective equipment (PPE). Head protection, such as a hard hat, should be worn if there is a risk of a falling object. Safety goggles and face shields should be worn when working around tools or machines that may produce flying particles.
- When working around cranes and hoists, don’t work underneath loads, inspect the equipment before use, and do not exceed the lifting capacity.
- When working at height, secure objects to prevent them from falling. To prevent or deflect falling objects, use toeboards, screens, nets, or canopies.

### ***Masonry wall construction***

Constructing concrete or masonry walls present struck-by hazards when lifting equipment is putting slabs in place or when shoring is required. To stay safe:

- Never exceed a device’s lift capacity.
- Shore or brace structures until permanent supporting structures are in place or concrete has been tested to ensure that it can hold the weight. Also, use an automatic holding device to support forms in case of lifting mechanism failure.
- To prevent unrolled wire mesh from recoiling, secure the ends or turn the roll over.

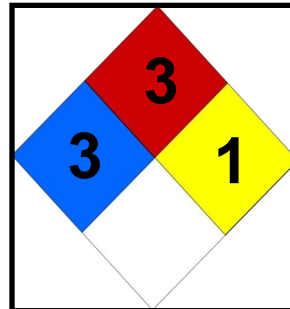
## Chemical Spotlight: Mesityl Oxide

Mesityl oxide is a colorless, oily liquid with a strong peppermint or honey-like odor. It's used as a solvent for synthetic fibers and rubbers, oils, gums, resins, lacquers, varnishes, inks, and stains. It's also used as an insect repellent and in making paint removers.

Mesityl oxide isn't compatible with oxidizing agents, strong acids, strong bases, reducing agents, and halogens. Store the chemical in tightly closed containers in a cool, dark, well-ventilated area. Sources of ignition are prohibited where mesityl oxide is used, handled, or stored. Metal containers involving the transfer of mesityl oxide should be grounded and bonded. Only use nonsparking tools and equipment, especially when opening and closing containers of the chemical.

If mesityl oxide is spilled or leaked, avoid breathing vapors, mist, or gas, and ensure adequate ventilation. Remove all sources of ignition, and evacuate personnel to safe areas. Use personal protective equipment (PPE), including goggles or safety glasses, gloves, flame-retardant protective clothing, and respiratory protection.

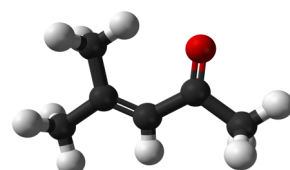
Prevent further leakage or spillage if safe to do so, and don't let the product enter drains, sewers, underground or confined spaces, groundwater, or waterways or discharge into the environment. Absorb liquids in vermiculite, dry sand, earth, or a similar material, and deposit in sealed containers. Ventilate and wash the area after cleanup is complete. It may be necessary to contain and dispose of mesityl oxide as a hazardous waste. Contact the federal Environmental Protection Agency (EPA) and local environmental regulatory agency for specific recommendations.



*"...avoid breathing vapors, mist, or gas, and ensure adequate ventilation."*



Source: Safety BLR

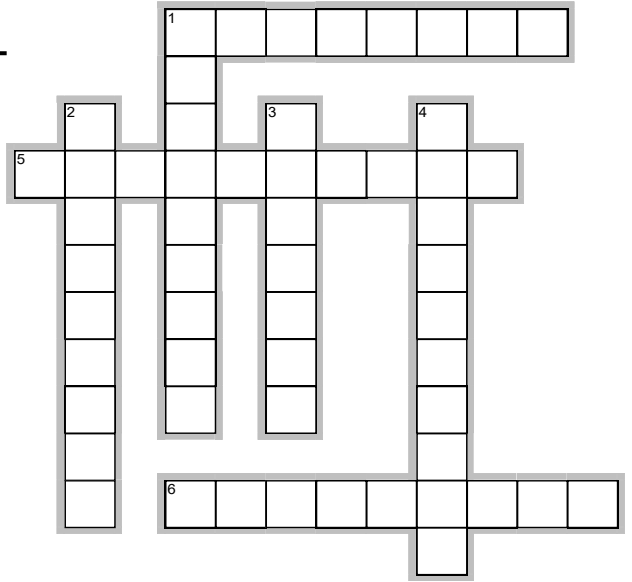


# Fun Page

F  
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E

## Across

1. Drain Cleaner and Bleach produces \_\_\_\_\_ gas
5. Always use bleach in a well - \_\_\_\_\_ area to help disperse the fumes.
6. Eye exposure to hazardous chemicals can cause permanent \_\_\_\_\_.



## Down

EclipseCrossword.com

1. Never operate a forklift if you are not trained and \_\_\_\_\_ to do so.
2. If your workplace has slippery surfaces, wear slip-\_\_\_\_\_ shoes.
3. Hand Sanitizers normally contain more than 60% \_\_\_\_\_.
4. Mesityl oxide is a colorless, oily liquid with a strong \_\_\_\_\_ or honey-like odor.

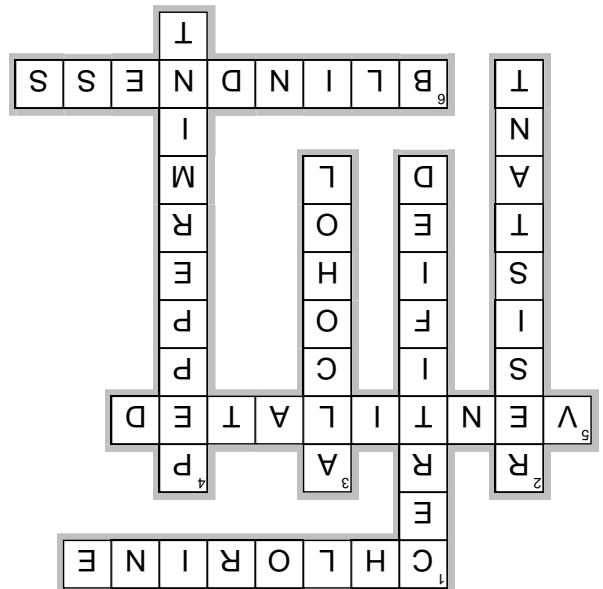
## Funny Corner



A few hours before the false hazmat alert.

## Puzzle Answers

EclipseCrossword.com





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### *Safety Quotes*

*Luck  
runs out  
but  
safety is  
good for  
life.*

*~Author  
Unknown*

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