

### Cleaning, Sanitizing, & Disinfecting

Proper cleaning and disinfecting are important to reduce the spread of infectious microorganisms. Chemical cleaners, sanitizers, and disinfectants can be effective and safe tools when handled properly. This fact sheet provides information about cleaning, sanitizing, and disinfecting surfaces to prevent the spread of disease, while minimizing harmful chemical exposures.



#### Cleaners:

Remove germs, dirt, and impurities from surfaces. Work by using soap/detergent, water and mechanical force to physically remove dirt and germs from surfaces.



#### Sanitizers:

Reduce germs on surfaces to levels considered safe for public health (usually within 30 secs during the FDA's Official Detergent Sanitizer Test).



#### Disinfectants:

Destroy almost all infectious germs on a surface, when used as the label directs (usually within 10 mins during the EPA's AOAC Use Dilution Test). No effect on dirt, soil, or dust. Should be used in high-touch areas. Products should be EPA: List N registered.

A complete procedure includes: clean, disinfect (dwell time), wipe, and rinse (with water) steps.

**Cleaning is always the first step.** Disinfectants and sanitizers do not work on dirty surfaces.

### Use The Right Product:

Disinfectants and sanitizers are used to control or destroy harmful microorganisms such as bacteria, viruses, or fungi. Many disinfectants and sanitizers can act against a spectrum of microorganisms.

The choice of which chemical product to use depends on the situation and should be evaluated with each different type of use:

- Some disinfectants/sanitizers are selected because of a need to control wide spectrum microorganisms effectively
- Some disinfectants/sanitizers may destroy a smaller range of microorganisms, but meet the disinfection level needed, and are safer to use
- Some disinfectants/sanitizers can also act as surfactants and be used to clean and disinfect in one-step

The choice of chemical product used also depends on the surface you want to disinfect. What works on one surface could harm a different surface.



### Product Labels & Safety Data Sheets (SDS)

Read and follow product labels and safety data sheets (SDS) before use:

- What chemicals and active ingredients are in the product?
- What are the hazards?
- What precautions/controls are required to use the product safely?
- What should be done in an emergency?

Limited, but essential information can be found on the container label including pictograms, signal word, hazard statements, and precautionary statements.

SDSs provide more detailed safety and health information including:

- Physical, health, and environmental hazards
- Safe handling, transport, storage (including incompatible chemicals), and required PPE for use
- First-aid and spill procedures

With this information, supervisors/employees can determine required exposure controls, such as ventilation, work conditions, procedures for use, and PPE.





## Hazards of Bleach & Other Harsh Disinfectants

All chemical disinfectants are, by their nature, potentially harmful to living organisms and can be harmful to humans.



Research has linked exposure to common disinfecting chemicals (bleach, ammonia, quaternary ammonium compounds, etc.) to potential health effects ranging from irritation (skin, eyes, and respiratory tract) to more severe allergic reactions. Chemical disinfectants can also be reactive, flammable, and explosive.

Bleach (sodium hypochlorite) is a common disinfectant. When used properly it is effective at killing germs, but there are many reasons to try to find safer products:



- Bleach is corrosive. Exposure can cause severe skin burns and eye damage and/or irritation in the eyes, mouth, lungs, and skin
- Mixing bleach with other chemicals containing ammonia, quaternary ammonium compounds, vinegar, or other acids, can create a toxic gas
- Bleach can cause asthma, not just trigger asthma attacks. Individuals with asthma or other breathing problems are more susceptible.
- Bleach is corrosive to many metal surfaces. It should not be used on stainless steel, aluminum, copper, brass, marble, or granite
- Bleach is neutralized by dirt and other organic material, so it is not effective on a surface that hasn't been cleaned
- Bleach has a short shelf life, solutions should be mixed daily

## Dwell Time Matters:

Dwell time is the amount of time disinfectants and sanitizers need to remain visibly wet on surfaces in order to effectively kill infectious microorganisms.

Dwell times vary by disinfectant and target organism type, such as bacteria, viruses, or fungi. Times can range from 30 seconds to 10 minutes, or more. Sanitizers and disinfectants only work if left on a surface for the specified dwell times. Follow the manufacturer's instructions on the label.



## Safer Active Ingredients:

Find products that perform well and are safer for human health and the environment. Disinfectants and sanitizers are regulated by the Environmental Protection Agency (EPA). The EPA developed the Design for the Environment (DfE) label to help identify and select safer chemical products. If these products are not available, try to use disinfectants and sanitizers that contain active ingredients such as:

- Ethanol
- Isopropanol (isopropyl alcohol),
- Hydrogen peroxide,
- L-Lactic acid, or citric acid.

Avoid products containing peracetic acid. It is highly corrosive and is reported to severely irritate eyes, skin, and respiratory systems at low exposures. Refer to the EPA for more information on safer chemical products.





---

## Hazard Control for Sanitizers & Disinfectants:

Many methods are used to reduce exposures. Preventive measures, such as elimination or substitution with a less toxic chemical, can directly remove the hazard. First, consider if the chemical can be replaced by a safer one that eliminates or minimizes the hazards. Then, use a combination of controls to reduce exposure.

---

### Engineering Controls:

Engineering controls isolate the hazard. They protect people by eliminating or reducing exposures at the source. These controls include ventilation, enclosure, or isolation measures. Good ventilation with outside air is an effective way to prevent accumulation of cleaning, sanitizer, and disinfectant vapors. During chemical use, ventilate the work space with outside air. Open doors and windows, use fans (appropriate positioning), bring in outside air with ventilation systems, or use local exhaust ventilation.



---

### Work Practice Controls:

#### Work Practice Controls :

How is the product handled? Is the product sprayed? Wiped? Products that are developed as aerosol sprays produce larger inhalation risks, while liquids in spray bottles help reduce that risk. Products formulated as wipes reduce the potential of airborne exposure even further. Consider the type of application and, when possible, choose products that reduce the potential for inhalation. Disinfectants are often misused and overused, including incorrect concentrations and solutions. More is not necessarily better. Work practice controls identify how to work in ways to minimize exposure, such as:

- Use dispensing systems and equipment to dilute concentrates
- Conduct mixing and application carefully to avoid splashing and spray drift
- Keep bottles closed when not in use
- Avoid skin contact
- Pre-plan how to respond safely to chemical spills, exposures, and emergencies

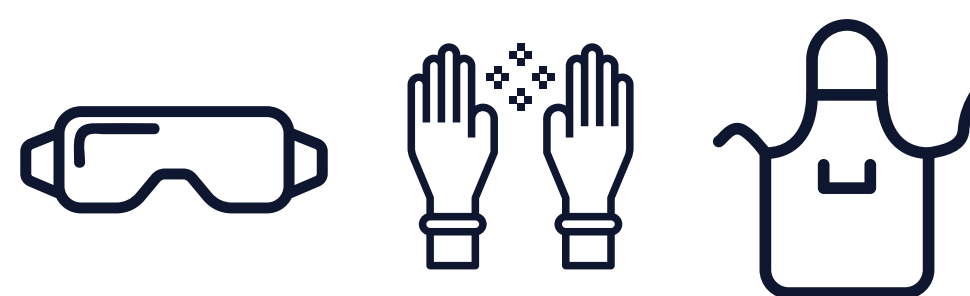


### Personal Protective Equipment (PPE):

Personal Protective Equipment (PPE) is used when all other control methods have been implemented. PPE is considered the last line of defense, acting as a barrier between the worker and the hazard. Appropriate PPE should be worn when handling cleaners, sanitizers, and disinfectants. PPE should be selected with regard to the products:

- Hazard profile (corrosive, flammable, etc.)
- Physical nature (solid, liquid, etc.)
- Routes of entry into the human body (inhalation, absorption, ingestion, etc.)

Designated PPE is identified on product labels or Safety Data Sheets. At UConn, job specific PPE is designated on department Work Hazard Assessment forms (WHA's). Contaminated PPE should be appropriately treated or disposed of, with replacements readily available. Chemicals dispensed by spraying should, in particular, be carefully evaluated. Check for eye, respiratory, skin, and hand protection requirements.



---

### Resources:

- [CDC: Cleaning and Disinfecting Your Facility](#)
- [EPA: Selected EPA-Registered Disinfectants](#)
- [EPA: List N: Disinfectants for Use Against SARS-CoV-2 \(COVID-19\)](#)
- [EPA: Design for the Environment Logo for Antimicrobial Pesticide Products](#)
- [University of Connecticut: Hazard Communication Program](#)
- [University of Washington: Safer Cleaning, Sanitizing and Disinfecting Strategies to Reduce and Prevent COVID-19 Transmission](#)
- [University of California San Francisco/WSPH: What's The Problem With Bleach?](#)

