



## Common Types of Disinfectants:

The following two tables provide general information only. Phenolics and quats are available in many formulations with different properties. Follow the manufacturer's recommendations for use.

Type	Tips for Use	Advantages	Disadvantages
Chlorine Compounds	<ul style="list-style-type: none"> <li>-Dilute household bleach 1:10 (~5000ppm free chlorine), make fresh monthly</li> <li>-Store diluted solutions in sealed container that is protected from light.</li> <li>-Use to decontaminate liquid culture media, for spill cleanup, and to wipe down work surfaces</li> <li>-Fisher Scientific supplies <i>Fisherbrand*</i> Bleach Solution Dispenser. It is a unique, two-bottle design and fixed-ratio trigger sprayer automatically mixes concentrated bleach with tap water to make a 10:1 water-to-bleach solution. Cat. No. 23-640-127</li> </ul>	<ul style="list-style-type: none"> <li>-Relatively nontoxic</li> <li>-Low cost</li> <li>-Effective with detergents</li> <li>-Fast acting</li> <li>-Broad spectrum effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>-Inactivated by organic material such as blood, do not use at less than 1:10 dilution</li> <li>-Corrosive</li> <li>-Irritates mucus membranes, eyes, and skin</li> <li>-No residual activity on surfaces</li> <li>-Can damage clothing</li> <li>-Produces toxic chlorine gas if mixed with acids or ammonia compounds</li> <li>-Can't be used to disinfect radioactive iodine.</li> </ul>
Alcohols	<ul style="list-style-type: none"> <li>-Dilute to 70% in water, (loses effectiveness at concentrations above 90%)</li> <li>-Use to clean instruments and wipe down interior of Biological Safety Cabinets and bottles, etc. to be put into Biological Safety Cabinets</li> <li>-Use as topical antiseptic on intact skin</li> </ul>	<ul style="list-style-type: none"> <li>-Non-corrosive</li> <li>-Effective with detergent</li> </ul>	<ul style="list-style-type: none"> <li>-Can have reduced effectiveness in organic material, does not penetrate organic material</li> <li>-Flammable</li> <li>-No residual activity and limited effective exposure time due to high rate of evaporation</li> </ul>
Phenolics	<ul style="list-style-type: none"> <li>-Dilute according to manufacturer's instructions</li> <li>-Commonly used to clean walls, floors, etc</li> <li>-Useful in areas where organic matter cannot always be removed, such as animal areas</li> </ul>	<ul style="list-style-type: none"> <li>-Good effectiveness in organic material</li> <li>-Effective with detergent</li> <li>-Has some residual effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>-Toxicity varies with specific compound, can be absorbed through skin</li> <li>-Some formulations may have unpleasant odor</li> <li>-Corrosive</li> <li>-Skin irritant</li> <li>-Not effective against spores</li> </ul>
QUATS Quaternary Ammonium Compounds (cationic detergents)	<ul style="list-style-type: none"> <li>-Dilute according to manufacturer's instructions</li> <li>-Surfaces must be rinsed free of anionic soap or detergents before use</li> <li>-Commonly used to clean walls, floors, etc</li> </ul>	<ul style="list-style-type: none"> <li>-Strong surface activity</li> <li>-Low toxicity</li> <li>-Non-corrosive</li> <li>-Effective over wide pH range</li> </ul>	<ul style="list-style-type: none"> <li>-Easily inactivated by organic materials, anionic detergents, and salts of metals in water (hard water)</li> <li>-Skin irritant</li> </ul>

## Disinfectant Selection:

	Chlorine Compounds	Alcohols	Phenolics	Quats
Bacteria	Very good	Good	Good	Good for gram positive
Envelope Viruses	Very good	Good	Good	Good
Non-envelope Viruses	Very good	Fair**	Fair**	Not effective
Fungi	Good	Fair	Good	Fair
Bacterial Spores	Good with high concentration	Not effective	Not effective	Not effective
Protozoal Parasites*	Moderate with high concentration and long contact time (hours)	Not Effective	Not Effective	Fair (some quats at high concentration)

\* hydrogen peroxide most effective

\*\* check disinfectant susceptibility for individual virus

## Decontamination Procedures:

For any spills of agents that are transmitted by inhalation, such as *Mycobacterium tuberculosis*, evacuate the lab immediately, close the door, do not allow any one to enter the lab, remove any contaminated clothing, wash exposed skin with soap and water, called the Biosafety Officer for assistance (626-6002). Report all spills to P.I. or lab supervisor.

### Toxin Decontamination

- Use 2N NaOH or other decontaminant proven to be effective against a specific toxin
- Follow below clean-up procedures

### Materials to keep on hand for spill cleanup

- Written spill procedure including emergency phone numbers
- Disinfectant suitable for biological materials and surfaces being used
- Paper towels, gloves, and shoe covers
- Forceps to pick up sharps, including broken glass
- Sharps container for broken glass, etc
- Squeegee (or other appropriate device) and dustpan to clean up shards of broken glass in contaminated liquid, should be autoclavable or otherwise capable of being decontaminated
- Biohazard bags (red bags for pick-up or autoclave clear bags for 60 minutes at 121 degrees C)

### Small and moderate spills outside the biological safety cabinet

- Remove any contaminated clothing and put in autoclavable bag. Be aware that autoclaving may damage fabric.
- Notify other workers in the area of the spill and control traffic through area.
- Wear shoe covers if spill is on floor, may have splashed beyond immediate area of spill.
- Put on gloves and cover spill area with paper towels.
- Pour disinfectant over towels from edges of spill to center, be carefully not to splatter.
- Decontaminate all objects in spill area.
- Allow 20-30 minutes of contact time.
- Pick up any sharps, including broken glass, with forceps and place in sharps container.
- Use squeegee (or other appropriate device) and dustpan to recover any shards of broken glass in contaminated liquid. Decontaminate squeegee and dust pan.
- Wipe area with disinfectant and clean paper towels and put in biohazard bag.
- Mop if spill is on floor.

- Remove gloves and foot covers before leaving area of the spill, put in biohazard bag.
- Wash hands.

#### Large spills (greater than 100ml) within or without of the biological safety cabinet

- Evacuate room, close doors, prevent others from entering, and wait 30 minutes for aerosols to settle.
- Follow above procedures for small and moderate spills.

#### For small spills in a biological safety cabinet

- Leave the cabinet running.
- Wipe down all interior cabinet surfaces with appropriate disinfectant.
- Wipe down all supplies and equipment in cabinet.

#### For moderate spills in a biological safety cabinet follow general spill procedures plus

- Leave the cabinet running.
- Wipe down all interior surfaces.
- Determine if spill has gone beyond the work surface such as on the grilles or in side seams. If yes, disassemble as much of cabinet as possible for decontamination.
- If the cabinet has a catch basin below the work surface that may be involved in the spill, flood the basin with disinfectant. Do not use alcohol as a large quantity of alcohol presents a flammable hazard. Clean basin after 20 minutes.
- Autoclave or wipe down all items in cabinet with disinfectant.
- Let cabinet run for at least 10 minutes after cleanup.

#### For major spills in a biological safety cabinet

- Contact the Biological Safety Officer in DEHS (626-6002) to determine if professional decontamination is indicated.

## **Accidental Exposure Response:**

If spill results in a hazard exposure (i.e. face and/or eye splash, cut or puncture with sharps, contact with non-intact skin):

- Encourage needle sticks and cuts to bleed, gently wash with soap and water for 5 minutes; flush splashes to the nose, mouth, or skin with water; and flush eyes at the nearest eyewash station with clean water for 5 minutes.
- For all injuries and biological exposures, administer first aid as needed and seek medical attention.
  - **Regular business hours: Boynton Health Service Urgent Care, 410 Church Street SE (625-3222)**
  - **After hours: Fairview University Medical Center Emergency Room, 500 Harvard St SE (273-2700)**  
These locations are prepared to deal with laboratory hazard exposures.
  - **For serious injuries call 911** and wait for assistance.
  - If you are outside the Twin Cities area, or if you choose not to go to Boynton or Fairview, you may seek medical attention at the closest available medical facility or your own healthcare provider.
- Report the incident to your supervisor as soon as possible, fill out accident report form, and report all biohazard incidents requiring medical treatment to the Biological Safety Officer (**626-6002**).

**Note:** It is important to fill out all of the appropriate paperwork for **every** accidental exposure in order to be eligible to collect workers compensation should any complications arise in the future.

## Reference:

*Disinfection, Sterilization, and Preservation* edited by Seymour S. Block, Lippincott Williams & Wilkins, Philadelphia, 2001

For EPA registered antimicrobial products effective against certain blood borne/body fluid pathogens, Mycobacteria spp (tubercle bacteria), human HIV-1 virus, Hepatitis B or Hepatitis C virus as well as products classified as sterilizers and products used for medical wastes see <http://www.epa.gov/oppad001/chemregindex.htm>.

APIC (Association for Professionals in Infection Control and Epidemiology) "Guidelines for Selection and Use of Disinfectants" reprint from American Journal of Infection Control see <http://www.apic.org/AM/Template.cfm?Section=Home&CONTENTID=813&TEMPLATE=/CM/ContentDisplay.cfm>

For information on " FDA-Cleared Sterilants and High Level Disinfectants with General Claims for Processing Reusable Medical and Dental Devices" published in November 2003 see <http://www.fda.gov/cdrh/ode/germlab.html>.

*Biological Safety Principles and Practices* edited by Diane Fleming & Debra Hunt, ASM Press, Washington DC, 2000.