



# **Biosafety Manual**

1-5-20



Back of Title Page

## 1.0 Purpose

The purpose of Western's *Biosafety Manual*, Section 24 of the *Departmental Safety Information Book*, is to describe laboratory work practices and procedures which are necessary to ensure that University laboratory employees are protected from health hazards associated with biological agents used in laboratories. The manual addresses this objective by including the requirements from the Centers for Disease Control and Prevention's Office of Safety, Health, and Environment and the National Institutes of Health. These two organizations jointly publish and update two national publications on biosafety, as follows:

1. *Biosafety in Microbiological and Medical Laboratories (BMBL)* and
2. *Primary Containment for Biohazards: Selection, Installation, and Use of Biosafety Cabinets*.

The most recent editions of these publications (respectively) are considered national guidelines to promote the safety and health of workers in biological and medical laboratories. Both may be downloaded free at this [web link](#).

## 2.0 Scope

This University Biosafety Manual applies to all laboratory employees, including student employees, working on laboratory scale operations involving laboratory-related use of biological agents. It applies to students learning in laboratories as well.

## 3.0 Biosafety Risk Assessment and Biological Safety Levels

A risk assessment is provided for each biological agent used at Western. The principal hazardous characteristics of a biological agent are: (1) its capability to infect and cause disease in a susceptible human or animal host, (2) its virulence as measured by the severity of disease, and (3) the availability of preventive measures and effective treatments for the disease.

Generally, agents used at the University are in Risk Group 1. These are agents not associated with disease in healthy adult humans. They are generally handled at Biosafety Level 1 (BSL-1) (see Appendix A).

A few agents used at the University may be in Risk Group 2. These are agents associated with human disease that is rarely serious and for which preventive or therapeutic interventions are often available. These agents are generally handled at Biosafety Level 2 (BSL-2) (See Appendix B).

No agents at the University are in Risk Group 3, which are agents associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk). They would be handled at Biosafety Level 3, with very specific containment requirements. Any department or faculty member wishing to use a Risk Group 3 agent should contact the director of Environmental Health and Safety well in advance.

## 4.0 Protective Equipment

The laboratory supervisor, principal investigator or faculty mentor (or designee) is responsible for selecting and acquiring appropriate personal protective equipment, maintaining its availability, and establishing cleaning and disposal procedures. Standard personal protective equipment must be provided by the employer to employees free of cost. Students may be asked to provide their own personal protective equipment.

Refer to the University's Program Information regarding [Personal Protective Equipment](#), [Respiratory Protection](#), and [Hearing Conservation](#).

Protective clothing used around biological agents is removed before leaving the work area as described in Appendices A and B. Gloves should be removed before touching other surfaces, such as doorknobs, drawer pulls, or faucet handles. Hands should be washed after wearing gloves.

Laboratory coats or aprons are worn by laboratory employees whenever handling biosafety level 2 agents (See Appendix B). Laboratory coats must be cleaned regularly. If a spill occurs on the laboratory coat or personal clothing, it must be decontaminated before normal washing or disposal (autoclaved or disinfected (see Table 24-1)). Laboratory coats must not be laundered with personal laundry.

## 5.0 Emergency Procedures

Refer to Appendix C for emergency procedures.

Locations where biological agents are used and/or stored should have access to a supply of equipment and materials for use in the event of a spill. Spill response materials may include:

- Absorbent materials
- Personal protective equipment
- Plastic bags to contain contaminated absorbent

## 6.0 Accidents and Accident Reporting

Accidents or injuries that occur in the laboratory and require medical treatment must be reported and treated immediately. All accidents, whether resulting in injury or only property damage, should be carefully analyzed with the results reported to all who might benefit. Analysis includes what was done wrong and what can be done to keep the event from happening again. Accident reports are kept on file with the Director of Environmental Health and Safety and are made available to employees upon request. Please refer to Western's [General Safety and Accident Prevention Manual](#) for more information on accident reporting.

## 7.0 Equipment and Maintenance

All local exhaust ventilation hoods, biological safety cabinets (BSC) and other engineering controls shall be functioning properly. Improperly functioning equipment, out of service equipment, and equipment under repair shall be tagged "OUT OF SERVICE" and locked out if possible. The equipment shall not be restarted without the approval of the Department Safety Officer or designee.

Biological Safety Cabinets meet requirements in document 2 listed in Part 1.0, Purpose.

## 8.0 Inspections

Each laboratory employee evaluates the condition of all personal protective equipment (safety glasses, goggles, gloves, hearing protection, etc.) before use. For more information, refer to [Personal Protective Equipment](#). Laboratory employees ensure that fume hoods and biological safety cabinets are working before each use.

Facilities Management conducts annual inspections of chemical fume hoods, safety showers, eyewashes, and fire extinguishers. Facilities Management inspects the following items at appropriate intervals:

- Emergency lighting and/or illuminated exit signs,
- Fire alarms,
- Smoke and heat detectors and sprinklers,
- Fire doors,
- Fire extinguishers, and
- Fire suppression systems.

Biological safety cabinets are certified annually if they are used for personnel protection. They must meet the requirements for the appropriate Biosafety Level in use in the area.

## 9.0 Medical Evaluation

Medical attention, including medical consultation and follow-up, is provided to employees under the following circumstances:

- Whenever a laboratory employee develops signs or symptoms that may be associated with a biological agent to which the employee may have been exposed in the laboratory.
- Whenever a spill results in the likelihood of an exposure to a biological agent causing human disease.

All medical examinations are provided by or under the direct supervision of a licensed physician. Medical clearance from a licensed physician is acceptable for Biosafety Level 1 and 2 work. Additional medical clearance requirements may be needed for Biosafety Level 3 work, such as more frequent evaluations. Questions related to consultations and examinations should be directed to the Environmental Health and Safety director.

### 10.0 Emergency Equipment

The Department Safety Officer or laboratory supervisory personnel ensures that adequate emergency equipment is available in the laboratory and is inspected periodically to ensure that it is functioning properly. Signs may be posted to show the location of safety showers, eyewashes, exits, first aid kits, fire extinguishers, etc. Each laboratory employee must be familiar with the location, application, and/or correct way to operate the emergency equipment listed below, and as described in your department's Chemical Hygiene Plan. The plan template can be found [here](#).

- Fire extinguishers,
- Fire alarms,
- Fire doors,
- Smoke detectors,
- Fire sprinklers
- Safety showers,
- Eyewashes,
- First aid kits.

### 11.0 Training

Refer to the University's [Health, Safety and Environmental Protection Policy](#), for information on training responsibilities. Generally, the laboratory supervisory personnel train each laboratory employee on the hazards of the biological agents present in the work area. The purpose of this training is to assure that all laboratory employees are adequately informed about the risks associated with working in the laboratory and what to do in the event of an accident.

- Training is provided at the time of an employee's initial assignment to a work area where biological agents are present. Additional training is provided prior to assignments involving new biological agents. Refresher information and training should be provided annually. The department maintains employee training records and sends a copy to the Environmental Health and Safety office.
- General lab safety and personal protective equipment training among other required elements can be done by enrolling in an [on-line EHS administered course](#). This training may be used to supplement departmental training. Please contact [EHS](#) at x3064 for assistance in enrolling.
- Employees may not use any personal protective clothing until they have received instruction on the proper selection, use, and limitations of the equipment. Refer to the [Personal Protective Equipment Program Information](#).
- Training related to biological agents should include:
  - Biosafety hazard risk assessment,
  - Protocols for safe use of the biological agent,
  - Emergency response and evacuation procedures (see Appendix C),
  - Engineering controls and biological safety cabinet operation, and
  - First aid.

## **12.0 Recombinant DNA Activities**

Recombinant DNA activities follow the guidance provided by the National Institutes of Health (NIH), [Office of Biotechnology Activities](#). The current version of the [NIH Guidelines For Research Involving Recombinant Or Synthetic Nucleic Acid Molecules](#) is used. Compliance with the guidelines is mandated as Western receives NIH funding. Contact the Environmental Health and Safety Office for additional information.

## **13.0 Hazards at Biosafety Level 2**

No biological agents used at the University involve immunizations or other prophylactic interventions prior to use. The University does not use any biological agents which require collection of baseline or periodic serum samples.

## **14.0 Hazards at Biosafety Level 3**

No biological agents at the University are in Risk Group 3, which are agents associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk). They would be handled at Biosafety Level 3, with very specific containment requirements. Any department or faculty member wishing to use a Risk Group 3 agent should contact the director of Environmental Health and Safety well in advance.

## **Appendices**

### **Appendix 24-A, Biosafety Level 1**

### **Appendix 24-B, Biosafety Level 2**

Both above appendices are taken from *Biosafety in Microbiological and Biomedical Laboratories*, 5<sup>th</sup> Edition, by the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institutes of Health HHS Publication No. (CDC) 21-1112, Revised December 2009

### **Appendix 24-C, Emergency Procedures**



## Appendix 24-A. Biosafety Level 1

The following standard practices, safety equipment, and facility requirements apply to BSL-1.

### A. Standard Microbiological Practices

1. The laboratory supervisor must enforce the institutional policies that control access to the laboratory.
2. Persons must wash their hands after working with potentially hazardous materials and before leaving the laboratory.
3. Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption must not be permitted in laboratory areas. Food must be stored outside the laboratory area in cabinets or refrigerators designated and used for this purpose.
4. Mouth pipetting is prohibited; mechanical pipetting devices must be used.
5. Policies for the safe handling of sharps, such as needles, scalpels, pipettes, and broken glassware must be developed and implemented. Whenever practical, laboratory supervisors should adopt improved engineering and work practice controls that reduce risk of sharps injuries. Precautions, including those listed below, must always be taken with sharp items. These include:
  - a. Careful management of needles and other sharps are of primary importance. Needles must not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal.
  - b. Used disposable needles and syringes must be carefully placed in conveniently located puncture-resistant containers used for sharps disposal.
  - c. Non-disposable sharps must be placed in a hard walled container for transport to a processing area for decontamination, preferably by autoclaving.
  - d. Broken glassware must not be handled directly. Instead, it must be removed using a brush and dustpan, tongs, or forceps. Plastic ware should be substituted for glassware whenever possible.
6. Perform all procedures to minimize the creation of splashes and/or aerosols.
7. Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
8. Decontaminate all cultures, stocks, and other potentially infectious materials before disposal using an effective method. Depending on where the decontamination will be performed, the following methods should be used prior to transport.
  - a. Materials to be decontaminated outside of the immediate laboratory must be placed in a durable, leak proof container and secured for transport.
  - b. Materials to be removed from the facility for decontamination must be packed in accordance with applicable local, state, and federal regulations.
9. A sign incorporating the universal biohazard symbol must be posted at the entrance to the laboratory when infectious agents are present. The sign may include the name of the agent(s) in use, and the name and phone number of the laboratory supervisor or other responsible personnel. Agent information should be posted in accordance with the institutional policy.
10. An effective integrated pest management program is required. (Note that Facilities Management provides this service. Contact them if insects or other pests are noted.)
11. The laboratory supervisor must ensure that laboratory personnel receive appropriate training regarding their duties, the necessary precautions to prevent exposures, and exposure evaluation procedures. Personnel must receive annual updates or additional training when procedural or policy changes occur. Personal health status may impact an individual's susceptibility to infection, ability to receive immunizations or prophylactic interventions. Therefore, all laboratory personnel and particularly women of childbearing age should be provided with information regarding immune

competence and conditions that may predispose them to infection. Individuals having these conditions should be encouraged to self-identify to the institution's healthcare provider for appropriate counseling and guidance.

## **B. Special Practices**

None required.

## **C. Safety Equipment (Primary Barriers and Personal Protective Equipment)**

1. Special containment devices or equipment, such as BSCs, are not generally required.
2. Protective laboratory coats, gowns, or uniforms are recommended to prevent contamination of personal clothing.
3. Wear protective eyewear when conducting procedures that have the potential to create splashes of microorganisms or other hazardous materials. Persons who wear contact lenses in laboratories should also wear eye protection.
4. Gloves must be worn to protect hands from exposure to hazardous materials. Glove selection should be based on an appropriate risk assessment. Alternatives to latex gloves should be available. Wash hands prior to leaving the laboratory. In addition, BSL-1 workers should:
  - a. Change gloves when contaminated, glove integrity is compromised, or when otherwise necessary.
  - b. Remove gloves and wash hands when work with hazardous materials has been completed and before leaving the laboratory.
  - c. Do not wash or reuse disposable gloves. Dispose of used gloves with other contaminated laboratory waste. Hand washing protocols must be rigorously followed.

## **D. Laboratory Facilities (Secondary Barriers)**

1. Laboratories should have doors for access control.
2. Laboratories must have a sink for hand washing.
3. The laboratory should be designed so that it can be easily cleaned. Carpets and rugs in laboratories are not appropriate.
4. Laboratory furniture must be capable of supporting anticipated loads and uses. Spaces between benches, cabinets, and equipment should be accessible for cleaning.
  - a. Bench tops must be impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals.
  - b. Chairs used in laboratory work must be covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant.
5. Laboratories windows that open to the exterior should be fitted with screens.

## Appendix 24-B. Biosafety Level 2

Biosafety Level 2 builds upon BSL-1. BSL-2 is suitable for work involving agents that pose moderate hazards to personnel and the environment. It differs from BSL-1 in that: 1) laboratory personnel have specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures; 2) access to the laboratory is restricted when work is being conducted; and 3) all procedures in which infectious aerosols or splashes may be created are conducted in BSCs or other physical containment equipment.

The following standard and special practices, safety equipment, and facility requirements apply to BSL-2.

### A. Standard Microbiological Practices

1. The laboratory supervisor must enforce the institutional policies that control access to the laboratory.
2. Persons must wash their hands after working with potentially hazardous materials and before leaving the laboratory.
3. Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption must not be permitted in laboratory areas. Food must be stored outside the laboratory area in cabinets or refrigerators designated and used for this purpose.
4. Mouth pipetting is prohibited; mechanical pipetting devices must be used.
5. Policies for the safe handling of sharps, such as needles, scalpels, pipettes, and broken glassware must be developed and implemented. Whenever practical, laboratory supervisors should adopt improved engineering and work practice controls that reduce risk of sharps injuries. Precautions, including those listed below, must always be taken with sharp items. These include:
  - a. Careful management of needles and other sharps are of primary importance. Needles must not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal.
  - b. Used disposable needles and syringes must be carefully placed in conveniently located puncture-resistant containers used for sharps disposal.
  - c. Non-disposable sharps must be placed in a hard walled container for transport to a processing area for decontamination, preferably by autoclaving.
  - d. Broken glassware must not be handled directly. Instead, it must be removed using a brush and dustpan, tongs, or forceps. Plastic ware should be substituted for glassware whenever possible.
6. Perform all procedures to minimize the creation of splashes and/or aerosols.
7. Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
8. Decontaminate all cultures, stocks, and other potentially infectious materials before disposal using an effective method. Depending on where the decontamination will be performed, the following methods should be used prior to transport:
  - a. Materials to be decontaminated outside of the immediate laboratory must be placed in a durable, leak proof container and secured for transport.
  - b. Materials to be removed from the facility for decontamination must be packed in accordance with applicable local, state, and federal regulations.
9. A sign incorporating the universal biohazard symbol must be posted at the entrance to the laboratory when infectious agents are present. Posted information must include: the laboratory's biosafety level, the supervisor's name (or other responsible personnel), telephone number, and required procedures for entering and exiting the laboratory. Agent information should be posted in accordance with the institutional policy.

10. An effective integrated pest management program is required. (Note that Facilities Management provides this service. Contact them if insects or other pests are noted.)
11. The laboratory supervisor must ensure that laboratory personnel receive appropriate training regarding their duties, the necessary precautions to prevent exposures, and exposure evaluation procedures. Personnel must receive annual updates or additional training when procedural or policy changes occur. Personal health status may impact an individual's susceptibility to infection, ability to receive immunizations or prophylactic interventions. Therefore, all laboratory personnel and particularly women of childbearing age should be provided with information regarding immune competence and conditions that may predispose them to infection. Individuals having these conditions should be encouraged to self-identify to the institution's healthcare provider for appropriate counseling and guidance.

## **B. Special Practices**

1. All persons entering the laboratory must be advised of the potential hazards and meet specific entry/exit requirements.
2. Laboratory personnel must be provided medical surveillance, as appropriate, and offered available immunizations for agents handled or potentially present in the laboratory.
3. Each institution should consider the need for collection and storage of serum samples from at-risk personnel.
4. A laboratory-specific biosafety manual must be prepared and adopted as policy. The biosafety manual must be available and accessible.
5. The laboratory supervisor must ensure that laboratory personnel demonstrate proficiency in standard and special microbiological practices before working with BSL-2 agents.
6. Potentially infectious materials must be placed in a durable, leak proof container during collection, handling, processing, storage, or transport within a facility.
7. Laboratory equipment should be routinely decontaminated, as well as, after spills, splashes, or other potential contamination.
  - a. Spills involving infectious materials must be contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material.
  - b. Equipment must be decontaminated before repair, maintenance, or removal from the laboratory.
8. Incidents that may result in exposure to infectious materials must be immediately evaluated and treated according to procedures described in the laboratory biosafety manual. All such incidents must be reported to the laboratory supervisor. Medical evaluation, surveillance, and treatment should be provided and appropriate records maintained.
9. Animal and plants not associated with the work being performed must not be permitted in the laboratory.
10. All procedures involving the manipulation of infectious materials that may generate an aerosol should be conducted within a BSC or other physical containment devices.

## **C. Safety Equipment (Primary Barriers and Personal Protective Equipment)**

1. Properly maintained BSCs, other appropriate personal protective equipment, or other physical containment devices must be used whenever:
  - a. Procedures with a potential for creating infectious aerosols or splashes are conducted. These may include pipetting, centrifuging, grinding, blending, shaking, mixing, sonicating, opening containers of infectious materials, inoculating animals intranasally, and harvesting infected tissues from animals or eggs.
  - b. High concentrations or large volumes of infectious agents are used. Such materials may be centrifuged in the open laboratory using sealed rotor heads or centrifuge safety cups.

2. Protective laboratory coats, gowns, smocks, or uniforms designated for laboratory use must be worn while working with hazardous materials. Remove protective clothing before leaving for non-laboratory areas, e.g., cafeteria, library, and administrative offices. Dispose of protective clothing appropriately, or deposit it for laundering by the institution. It is recommended that laboratory clothing not be taken home.
3. Eye and face protection (goggles, mask, face shield or other splatter guard) is used for anticipated splashes or sprays of infectious or other hazardous materials when the microorganisms must be handled outside the BSC or containment device. Eye and face protection must be disposed of with other contaminated laboratory waste or decontaminated before reuse. Persons who wear contact lenses in laboratories should also wear eye protection.
4. Gloves must be worn to protect hands from exposure to hazardous materials. Glove selection should be based on an appropriate risk assessment. Alternatives to latex gloves should be available. Gloves must not be worn outside the laboratory. In addition, BSL-2 laboratory workers should:
  - a. Change gloves when contaminated, glove integrity is compromised, or when otherwise necessary.
  - b. Remove gloves and wash hands when work with hazardous materials has been completed and before leaving the laboratory.
  - c. Do not wash or reuse disposable gloves. Dispose of used gloves with other contaminated laboratory waste. Hand washing protocols must be rigorously followed.
5. Eye, face and respiratory protection should be used in rooms containing infected animals as determined by the risk assessment.

#### **D. Laboratory Facilities (Secondary Barriers)**

1. Laboratory doors should be self-closing and have locks in accordance with the institutional policies.
2. Laboratories must have a sink for hand washing. The sink may be manually, hands-free, or automatically operated. It should be located near the exit door.
3. The laboratory should be designed so that it can be easily cleaned and decontaminated. Carpets and rugs in laboratories are not permitted.
4. Laboratory furniture must be capable of supporting anticipated loads and uses. Spaces between benches, cabinets, and equipment should be accessible for cleaning.
  - a. Bench tops must be impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals.
  - b. Chairs used in laboratory work must be covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant.
5. Laboratory windows that open to the exterior are not recommended. However, if a laboratory does have windows that open to the exterior, they must be fitted with screens.
6. BSCs must be installed so that fluctuations of the room air supply and exhaust do not interfere with proper operations. BSCs should be located away from doors, windows that can be opened, heavily traveled laboratory areas, and other possible airflow disruptions.
7. Vacuum lines should be protected with liquid disinfectant traps.
8. An eyewash station must be readily available.
9. There are no specific requirements for ventilation systems. However, planning of new facilities should consider mechanical ventilation systems that provide an inward flow of air without recirculation to spaces outside of the laboratory.
10. HEPA filtered exhaust air from a Class II Biological Safety Cabinet (BSC) can be safely recirculated back into the laboratory environment if the cabinet is tested and certified at least annually and operated according to manufacturer's recommendations. BSCs can also be connected to the laboratory exhaust system by either a thimble (canopy) connection or directly exhausted to the

outside through a hard connection. Provisions to assure proper safety cabinet performance and air system operation must be verified.

11. A method for decontaminating all laboratory wastes should be available in the facility (e.g., autoclave, chemical disinfection, incineration, or other validated decontamination method).

## Appendix 24-C. Emergency Procedures-Biological Agents

The major emphasis of these procedures is on pre-planning for immediate actions to cope with spills in a laboratory with biological agents. Obviously, all spills do not present the same degree of risk.

If a relatively large spill of biological materials or a spill involving a highly infectious agent occurs, the faculty member/principal investigator contacts the Environmental Health and Safety office (x3064) for assistance in decontamination and clean-up.

**Disinfection.** Appropriate disinfectants are presented in the Table of Chemical Disinfectants (Table 24-1) on the following page. A disinfectant containing detergent may be used to remove dirt as well as disinfect. A 3% solution of an iodophor, such as Wescodyne, or a 1 to 100 dilution of household bleach in a detergent solution or in water may be used. Gloves and eye protection are worn. Contact times in the table must be maintained. Clean-up materials, including gloves, wiping cloths, and sponges are placed into an autoclave-able container and steam sterilized before disposal.

**Spill in the Open Laboratory.** If a small quantity of biological material is spilled in the laboratory, responsibilities include:

1. Warn others in the area
2. Notify the Principal Investigator
3. Decontaminate with an appropriate disinfectant (Table 24-1).

**Spill in a Centrifuge.** Spills in a centrifuge have the potential for producing large volumes of aerosols. When the operator becomes aware that a spill has occurred involving biological materials, responsibilities include:

1. Turn off the centrifuge
2. Warn others in the area
3. Notify the Principal Investigator
4. Open carefully to minimize aerosols
5. Decontaminate with an appropriate disinfectant (Table 24-1).

**Spill of Radioactive Biohazardous Material.** In the event that a biological material which also contains a radioactive material has spilled, responsibilities include:

1. Warn others in the area
2. Leave the room and close the door
3. Notify the Principal Investigator
4. Call the Environmental Health and Safety office.

**Spill in a Biological Safety Cabinet.** A spill confined to the interior of a biological safety cabinet generally presents little or no hazard to personnel in the area. However, chemical disinfection procedures are initiated immediately while the cabinet ventilation continues to operate to prevent escape of contaminants from the cabinet.

Spray or wipe walls, work surfaces, and equipment with a suitable disinfectant. Sufficient disinfectant is used to ensure that drain pans and catch basins below the work surface contain disinfectant. The front exhaust grill and tray are lifted and surfaces are wiped. The catch basin is wiped and disinfectant drained.

This procedure will not disinfect the filters, blower, air ducts or other interior parts of the cabinet. If the entire interior of the cabinet requires disinfection, contact the Environmental Health and Safety office.

**Table 24-1. Chemical Disinfectants and Their Use in Infection Control**

<b>Use</b>	<b>Disinfectant</b>	<b>Activity Level</b>
For disinfecting clean surfaces:	1 part bleach diluted with 99 parts water (bleach is 5% sodium hypochlorite) Minimum contact time: 10 minutes	Intermediate
For disinfecting soiled areas or spills:	1 part bleach diluted with 9 parts water  Minimum contact time: 10 minutes	Intermediate
For disinfection of surfaces, except motors and electrical	Ethanol or isopropyl alcohol, 70%  Minimum contact time: 10 minutes	Intermediate
Disinfection of surfaces:	Hydrogen Peroxide, stabilized, 2% Minimum contact time: 10 minutes	High
Disinfection of surfaces:	Iodophor, 30-50 mg of free iodine per liter  70-150 mg of available iodine per liter Minimum contact time: follow manufacturer's instructions	Intermediate
Disinfection of surfaces:	Phenolic compounds, aqueous  Minimum contact time: follow manufacturer's instructions	Intermediate

*Make bleach solutions fresh daily, or whenever chlorine odor is not present.\**