

# **Instructions for the Laboratory Safety Inspection Form**

The following briefly describes what the Division of Research Safety (DRS) looks for during a typical laboratory inspection (for general laboratory safety and chemical safety – biological and radiation safety issues are only briefly addressed). The categories follow the form point by point.

## **General Safety**

### **Door Signs**

Emergency responders (e.g., Fire Department, Paramedics, Police) need information on the hazards present before entering a room. The Division of Research Safety provides the officially approved signs for posting laboratory contact information and listing special hazards. (Contact the Chemical Safety Section to request additional signs at [css@uiuc.edu](mailto:css@uiuc.edu).) The sign should be posted either in a three-card slot near the door, in an alternative card holder next to or on the door, or taped to the door in a way that emergency personnel can remove it in order to view the back side for hazards (if card holder is not available).

1. Key lab personnel are identified.  
The names and phone numbers (office and home) of the principal investigator and other knowledgeable employees/students should be listed on the front of the sign.
2. Hazard information sections are completed.  
The appropriate hazard information should be entered on the front and back of the sign.
3. The information is current and applicable to the lab.  
All door signs should be checked for accuracy at least annually. Additionally, the information should be updated whenever the contact or hazard information changes. Door signs should be dated when posted or updated, or at the time of the annual check.

### **Housekeeping**

4. Lab door is able to be secured.  
All doors that enter from the public areas of the building should be able to be locked to secure the laboratory.
5. View through door's window is unobstructed.  
If the laboratory door is outfitted with a window, it needs to remain unobstructed for emergency responders.
6. Aisles and exits are unobstructed.  
There should be no objects that block movement through aisles or exits. Emergency personnel should be able to access all areas of the laboratory through all exit doors, and should be able to move freely in the aisles when smoke may be present.
7. Work areas are uncluttered.  
Floor space and bench space should not be cluttered with excessive storage. Physical hazards should be minimized (e.g., tripping hazards, items that could fall on someone, etc.), and combustible/flammable materials should not be stored in excessive amounts.
8. Storage areas are uncluttered.  
Materials should be stored in such a way that they will not accidentally slide, collapse, fall, or spill.
9. Ceiling tiles are in place.  
Ceiling tiles should be kept intact and in place as part of the ventilation scheme of the room.

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### **Equipment**

10. Equipment manuals are available.  
Safe operating instructions (usually from the manufacturer) should be available as part of the Standard Operating Procedures required by the UIUC Chemical Hygiene Plan.
11. Equipment is unobstructed.  
Clutter should be limited to keep equipment readily accessible and operable.
12. Guards are in place.  
The Point-of-Operation of any piece of equipment must have a guard. Examples include:
  - Nip or Pinch Points
    - between two rotating parts;
    - between a rotating part and a stationary part;
    - or between a rotating part and longitudinal motion
  - Hazardous projections on rotating parts
  - Hazardous reciprocating motionBelt-driven equipment should have a guard in place, completely covering the belt and pulley.
13. Equipment is secured or on a stable surface.  
Equipment should be set up or stored in such a way that it will not accidentally fall or tip over.
14. Auto shut-offs are on equipment.  
Any equipment that is used when unattended should have an automatic shut-off to prevent situations that might result in fire or other emergencies. An example is a heating bath over-temperature shut-off (for when the water completely evaporates).

### **Electrical Safety**

15. Emergency cut-off switches are accessible.  
Access to cut-off switches should not be obstructed. Three-foot clearances should be maintained around all emergency pull switches. Striped tape applied to the floor is recommended to visually mark the clearance area.
16. Electrical panels are accessible.  
Access to electrical panels should not be obstructed. Three-foot clearances should be maintained around all circuit panel boxes. Striped tape applied to the floor is recommended to visually mark the clearance area.

### **Electrical Outlets**

17. Outlets are not overloaded.  
Electrical circuits should not be overloaded. "Overloaded" is defined as excessive electrical cords plugged into a circuit through the use of adapters, which allow multiple plug capability. Powerstrips with circuit breakers can be used, but should not be used in a series or with adapters. Three-to-two-prong adapters should never be used to plug a three-wire plug into a two-wire system.
18. GFCI outlets are present.  
Ground Fault Circuit Interrupter (GFCI) protection must be used for electrical appliances that will be operated within six feet of water.

### **Electrical Cords**

19. Electrical cords are clear of aisles, sinks and heat sources.
20. Electrical cords are in good condition.  
Cords should be inspected for any damage. Cords with damage to the insulation (i.e., wires are visible or tape is needed to hold it together) or frayed cords should be replaced immediately.

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Equipment with cords that have obvious shorts should also be taken out of service until the cords are replaced.

### **Extension Cords**

21. Extension cords are used temporarily (less than 90 days).  
Electrical equipment should be located so that extension cords are not needed on a permanent basis or an outlet should be installed close to the equipment. Power strips with circuit breakers are acceptable to use, but should not be connected in a series or to an extension cord.
22. Extension cords are of 3-wire design, with the ground plug intact.  
All extension cords must be properly grounded three-wire cords. This includes having the ground plug intact.

### **Emergency/Safety Equipment**

23. Emergency contact information is posted by the telephone.  
Emergency phone numbers (including 9-911) should be posted by or on all phones in the laboratory.
24. Fire alarm pull stations are unobstructed.
25. Stocked first aid kit is available.  
The first aid kit should be available and unobstructed. Consider the various injuries that could happen in the laboratory, and assemble the first aid kit accordingly. For example, if hydrofluoric acid is used in the laboratory, then calcium gluconate gel should be available for the first aid treatment of skin exposure to hydrofluoric acid. Personnel should be trained on the proper use of the kit's contents. Periodically check expirations on any ointments or over-the-counter pharmaceuticals. Periodically evaluate the hazards present in the laboratory, and adjust the first aid kit contents as needed.
26. Stocked spill clean-up kit is available.  
A spill clean-up kit should be available and unobstructed. Consider the spills that could happen in the laboratory, and assemble the spill clean-up kit accordingly. Materials should be evaluated for compatibility with the hazards in the laboratory that could be spilled. Universal sorbents, such as 3M Powersorb, and spill pads are recommended for spill kits. If any materials are used, they should be re-stocked immediately. Periodically evaluate the spill clean-up kit, and adjust the kit contents as needed.

### **Fire Extinguishers**

27. Extinguishers are correct type for the hazards present.  
In general, fire extinguishers suitable for the hazard to be protected should be available. There are five types of fires:
  - Class A: Ordinary combustibles such as wood, paper, cloth, trash and plastics.
  - Class B: Fires in flammable liquids (such as gasoline, petroleum and paint) and flammable gases (propane, butane, etc.).
  - Class C: Energized electrical equipment, such as motors, transformers and appliances.
  - Class D: Combustible metals, such as potassium, sodium, aluminum and magnesium.
  - Class K: Cooking oil fires.Most labs should have an ABC type of extinguisher, as they work on the most common types of fires. If there are Class D or K fire hazards, appropriate extinguishers should also be present. For additional information contact Fire Safety at 333-9711 or [oshs@uiuc.edu](mailto:oshs@uiuc.edu).
28. Extinguishers are mounted to the wall or in extinguisher cabinet.  
Fire extinguishers should be mounted on the wall, or in an extinguisher cabinet, not sitting on the floor.

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29. Extinguishers are unobstructed.  
Fire extinguishers should be in an obvious and accessible location near the exit door and/or near the hazard.
30. Pressure gauges are in the green.  
Check indicators (if present) on fire extinguishers to be sure that the pressure gauge is in the normal range. If the indicator is not in the normal range, the extinguisher needs to be serviced through Facilities & Services, Fire Safety (333-9711).
31. Extinguisher has not been used.  
Make sure the pin is in place on the extinguisher handle and the tie unbroken. If there is any indication of usage, the extinguisher needs to be serviced through Facilities & Services, Safety & Compliance Division (265-9828).
32. Extinguisher is not damaged or corroded.  
Confirm that seals or tamper indicators are intact. Check that extinguisher operating instructions are legible and face outward. Note any obvious physical damage. Confirm that the Hazardous Material Identification System label is in place.
33. Extinguisher has been tagged in the last year.  
The fire extinguisher should be tagged with an inspection date within the last year.
34. Extinguisher has been inspected within the last month.  
Visual inspections of each fire extinguisher should be performed every month using the above points. The inspection should be noted on the back of the annual inspection tag.

### **Safety Shower and Eyewash**

Safety showers should be available in labs where there is the potential hazard of injury to the skin due to contact with a corrosive, severely irritating or toxic chemical. Eye washes should be available in labs where there is the potential hazard of injury to the eye due to contact with a chemical or where they are exposed to biological materials that are Risk Group 2 or greater. For information on these points see the UIUC Emergency Eyewash and Shower Program at <http://www.drs.uiuc.edu/gls/eyewashes>.

35. Safety Shower/Eyewash is unobstructed.  
Safety showers and eye washes should be in accessible, unobstructed locations that require no more than 10 seconds to reach.
36. Safety Shower/Eyewash location is identified by a highly visible sign.  
Safety shower and eye wash locations should be identified with a highly visible sign that is visible within the area served by the safety shower and/or eye wash.
37. Safety Shower/Eyewash is tested regularly.  
Safety showers should be activated and tested at least annually. Eye washes should be activated and tested weekly. These equipment inspections should be recorded on tags, initialed and dated after performing the inspection.

### **Chemical Safety**

38. Spark-producing equipment is kept away from flammables.  
Spark-producing equipment, such as Variacs or Rheostats, should not be located in an area where flammable gases or liquids are stored or used (e.g., laboratory chemical hoods).
39. No Food & Drink in lab  
Food and beverages are forbidden in laboratories. Food and beverages must not be stored in refrigerators that also store biological, chemical or radioactive materials.

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### 40. House Vacuum – protected from vapors

No liquids should be aspirated directly into the house vacuum lines. If laboratory personnel from different laboratories aspirate incompatible chemicals through the vacuum lines, those chemicals can violently react with each other. Additionally, vacuum lines can become blocked and vacuum pump oil can become contaminated and degraded, resulting in damage to the system.

### **Chemical Hygiene Plan (CHP)**

#### 41. Current CHP is available.

A current copy of the laboratory's CHP should be available to all laboratory personnel.

#### 42. Lab-specific safety information is included.

The CHP should identify all the hazards present in that laboratory and describe specific measures for effectively controlling those hazards. The laboratory's CHP is usually presented as general safety information (such as the UIUC Chemical Safety Guide) supplemented by laboratory-specific safety information. For more about CHPs at UIUC, see [www.drs.uiuc.edu/css/chyp](http://www.drs.uiuc.edu/css/chyp).

#### 43. Lab personnel are trained on the CHP.

All laboratory personnel should know the location of the CHP and be familiar with its contents.

#### 44. Material Safety Data Sheets are available.

Laboratory personnel should know how to obtain a Material Safety Data Sheet (MSDS) for any given chemical in the laboratory (this is a required part of the CHP). MSDSs should accompany all purchased chemicals, should be retained upon receipt, and should be immediately available from a vendor. MSDSs can also be obtained through the DRS web site at [www.drs.uiuc.edu/css/msds/](http://www.drs.uiuc.edu/css/msds/).

#### 45. Chemical inventory available

Without a chemical inventory, it is difficult to support the claim that all the hazards in a laboratory have been identified. A chemical inventory helps keep chemical quantities low and helps prevent over-purchasing. In addition, inventories can sometimes be useful in responding to an incident in the lab.

### **Personal Protective Equipment**

#### 46. Eye/face protection is worn while in lab.

Anyone in a laboratory should be wearing appropriate eye/face protection. At a minimum, this means safety glasses with side shields. Chemical goggles are recommended if there is a splash/spray hazard.

#### 47. Lab coats or aprons are worn.

Laboratory coats or aprons should be worn to prevent chemical, radioactive or biological materials from coming into contact with the skin or clothing. Any protective clothing worn should never be taken home to wash. Each department should have a laundry facility on site to clean/decontaminate any protective clothing that cannot be discarded. In the case where a department does not have a laundry facility, arrangements should be made with another department or a professional launderer.

#### 48. Appropriate gloves are worn.

*For use with chemicals:* Various types of gloves are required for various chemicals. Latex gloves are not a good choice for all-purpose chemical protection. Nitrile gloves are adequate for many chemicals, but the laboratory should have a glove chart for quick reference. If unsure which gloves to use, consult the glove chart in the UIUC Model Chemical Hygiene Plan or check with the manufacturer. Disposable gloves should not be reused. Reusable gloves should be checked routinely for holes/leaks.

*For use with biological materials:* Single-use disposable laboratory gloves are generally adequate. Because of potential allergic reactions, alternatives to latex gloves should be provided. Nitrile gloves are recommended. If reusable gloves are used, they must be decontaminated after each use.

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49. Respirator wearers have received approval, training and fit-testing.

If personnel use respirators, they are required by law to be medically evaluated, fit tested and trained prior to use. Contact the Division of Safety & Compliance at Facilities and Services for more information.

### **Chemical Storage**

50. Chemicals are stored per compatibility.

Incompatible chemicals give an undesired chemical reaction when mixed. This usually refers to substances that will react to cause an imminent threat to health and safety through an explosion, fire, and/or formation of toxic materials. Generally speaking, segregate acids and bases; acids from cyanides and sulfides; flammables from strong corrosives and oxidizers. For more information see: <http://www.ilpi.com/msds/ref/incompatible.html>.

51. Chemicals are stored in cabinets or on stable shelving.

Chemicals should be stored in cabinets or on stable shelving. Chemicals should not be stored on the floor or precariously on shelves where they could be knocked off or fall off.

52. Chemicals are stored in proper containers.

Container material must be appropriate for the chemical contents. Hydrofluoric acid should never be stored in glass. Nitric acid and other oxidizers should only be stored in glass. Food containers are never to be used for chemical storage, even if the label has been removed.

### **Chemical Containers**

53. Containers are in good condition.

All chemical containers should be in good condition with no cracks or leaks, and with the appropriate lid/cap. Any container that is not in good condition should be replaced immediately.

54. Containers are properly labeled.

All containers of chemical, biological, and radioactive materials must be labeled as to the contents and its hazard category (refer to a chemical compatibility chart). Even temporary containers should be labeled so that if an emergency arises, another person can identify what is in the container. For chemical waste, the container should describe the contents with the word "waste" (e.g., "waste acetone," "waste halogenated solvents," etc.).

55. Containers are closed when not in use.

All chemicals and chemical waste should be stored in containers that are able to be closed. Chemical containers (including chemical waste containers) are to be closed at all times unless in immediate use. Immediate use means that a person is in the vicinity of the container and is actively adding or removing chemicals from the container.

56. Secondary containment is used.

If bottles must be stored on the floor, they must be in a secondary container such as a sturdy plastic tub that minimizes accidental breakage. The secondary container should be able to contain the bottle and contents if breakage should occur.

### **Gas Cylinders**

57. Gas Cylinders are securely fastened to prevent tipping.

Gas cylinders should be secured to a wall or bench, or chained to a cart, to prevent tipping.

### **Peroxidizable Chemicals**

58. Peroxidizable chemicals are dated when opened.

Peroxidizable chemicals react with air to form shock-sensitive, explosive peroxides. They must be dated when opened.

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### 59. Peroxidizable chemicals are tested for peroxides every six months

Once opened, peroxidizable chemicals should be tested every six months for the presence of peroxides. Peroxidizable chemicals should be disposed of if no longer needed or if they have formed peroxides. For more information on peroxidizable chemicals see Chapter 7 of the UIUC Chemical Waste Management Guide:

<http://www.drs.uiuc.edu/css/guidesplans/wasteguide/chapter7.aspx?tblD=gp#peroxide>

### **Flammable Liquid Storage**

#### 60. Refrigerator is explosion-proof/-protected.

Flammable materials that must be kept in a refrigerator must be stored in one designed or modified for flammable storage or one that is explosion-proof. Standard household refrigerators have exposed ignition sources, making the refrigerator unsuitable for flammable material storage.

#### 61. Flammable cabinets are used.

If large amounts (gallon quantities) of flammable or combustible liquid are kept in a laboratory, flammable cabinets may be required. Consult with DRS and F&S Fire Safety for more information.

#### 62. NFPA maximum allowable storage volumes are not exceeded.

The National Fire Protection Association (NFPA) has set limits on flammable liquids stored in laboratories. Maximum quantities for flammable liquid storage are determined based on the type of laboratory inspected, the hazard classification of the flammable liquid, the container used for storage, and the fire protection features of the laboratory. For more information see:

<http://www.fs.uiuc.edu/sac/osh/oshflammable.cfm>.

### **Mercury Devices**

#### 63. Mercury-containing devices have been replaced or removed.

Refer to the UIUC Mercury Reduction Program ([www.drs.uiuc.edu/css/programareas/mercury/](http://www.drs.uiuc.edu/css/programareas/mercury/)) for details on how to reduce the amount of mercury present in the laboratory.

#### 64. No mercury thermometers are used in ovens.

Mercury thermometers should not be used in heated ovens. Broken thermometers in ovens pose a health hazard because heated mercury will volatilize such that it can be breathed in. This will also contaminate the oven, requiring its removal and disposal. Disposing of mercury-contaminated items is very expensive.

### **Chemical Fume Hoods**

#### 65. Chemical fume hoods have been inspected within the last year.

A certification sticker that has been dated during the past year should be on the hood. A green sticker indicates the hood passed inspection. A yellow sticker indicates the hood should be serviced as the air flow is too low or too high. A red sticker indicates the hood failed inspection and should not be used.

#### 66. Air flow into the hood is unobstructed.

Excess chemicals and/or equipment should not be stored in the hood, especially if it blocks proper air flow (i.e., blocks the slots between the back baffles). Large items that must be in a hood should be elevated approximately two inches on blocks or on a stand with legs to allow air flow beneath the item into the back bottom slot of the hood interior.

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### **Biological Safety**

1. Functional sink is in laboratory space.  
Laboratories should have a sink for handwashing. The sink should be kept stocked with soap and paper towels. A handwashing policy should be communicated to all laboratory members, which directs staff and students to wash their hands after they handle viable materials, after removing gloves, and before leaving the laboratory.
2. Exterior windows are sealed shut, or have fly screens present.  
If installing screens is not an option, windows should be sealed shut.
3. Biological Safety Cabinet(s) have been certified within the last year.  
A sticker that lists the last certification date should be present on the cabinet. It is required that a BSC be certified at the time of installation, annually thereafter, and any time the unit is relocated.
4. Lab space can be easily decontaminated.  
Spaces between benches, cabinets, and equipment should be readily accessible for cleaning. Carpets and rugs are prohibited because they are difficult to decontaminate.
5. Appropriate disinfectant for material is in lab.  
Work surfaces should be decontaminated on completion of work, at the end of the day, and after any spill or splash of viable material with disinfectants that are effective against the agents of concern. For most organisms, a 10% bleach solution is effective. However, for some organisms, 70% ethanol may be required. Note that bleach solutions should be prepared fresh each day.

### **Bench Tops**

6. Bench tops are made of an impervious material.  
Self-explanatory (to allow for easy decontamination).
7. Bench tops are resistant to chemicals and moderate heat.  
Bench tops should be resistant to acids, alkalis, organic solvents and moderate heat, any of which may contact the bench top during normal usage or during decontamination.

### **Laboratory Furniture**

8. Furniture is appropriately sturdy.  
Laboratory furniture should be sturdy, in good condition, and capable of supporting anticipated loading and uses.
9. Furniture can be easily decontaminated.  
Laboratory furniture should be easy to decontaminate. Accordingly, cloth-covered chairs are prohibited. Vinyl-covered chairs are acceptable.

### **Biohazard Waste Containers**

10. Containers are able to be closed.  
All containers and bags used for waste collection should be able to be closed. If a waste collection bag is kept in a container, the container should have a lid.
11. Containers are closed when not in use.  
When not in use, biohazard waste containers should be kept closed.
12. Containers display the biohazard symbol.  
All containers and bags used for waste collection should prominently display the international biohazard symbol. All bags used for waste collection must have the biohazard symbol printed on the bag. If the bag is kept in a container, the container should also have the biohazard symbol prominently displayed.

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13. Containers are appropriate for transport to autoclave.

Durable, leak-proof containers should be available to transport waste to the autoclave for decontamination. Secondary containment for autoclave bags helps prevent spills of material from unexpected holes or tears in the bag. Appropriate containers for transport include plastic or metal tubs. Do not place transport containers in the autoclave unless you are certain they are composed of "autoclavable" material. If bags are heavy, use a cart for transporting.

14. Sharps Disposal Containers are present.

Sharps disposal containers should be present for the proper disposal of laboratory sharps. Sharps Disposal Containers are available free from Campus Stores and come in three sizes: 1-quart, 2-gallon, and 8-gallon. DRS provides pick-up of full containers for disposal.

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### **Radiation Safety**

1. Weekly contamination surveys are conducted.  
Laboratories must perform and document surveys for radioactive contamination at least monthly and whenever quantities exceed thresholds specified in the laboratory's Radiation Permit.
2. All areas/containers with radioactive materials are identified with signs/labels.
3. Equipment for detecting radiation hazards is readily available.
4. Material is secured when unattended.  
Radioactive material must be attended by trained personnel or secured from removal when not attended.

### **Radioactive Materials Recordkeeping**

Laboratories must maintain records of the radioactive materials they possess and use, including records of liquid wastes disposed through the sanitary sewer.

5. Inventory of the lab's radioisotopes is available.
6. Records of quantities used are available.
7. Records of liquid waste disposed of via the sanitary sewer are available.

### **Radioactive Waste Containers**

Waste must be collected in appropriate receptacles and segregated according to half-life. Waste receptacles must be properly labeled and the contents of each waste parcel must be recorded.

8. Waste container is of appropriate material.
9. Wastes are segregated per half-life.
10. Waste container is properly labeled.
11. Contents of the waste container are recorded.

### **Containment and Shielding**

12. Workspace is lined with absorbent paper.  
Benches, fume hoods, etc., where loose radioactive materials are used must be lined with absorbent paper.
13. Shielding is used for highly radioactive materials.  
Sources with high levels of external exposure should be used and stored behind shielding to minimize exposures.
14. Tools are used for highly radioactive materials.  
Sources with high levels of external exposure should be handled with appropriate tools to minimize exposures.

### **Lasers**

15. Class IIIB or IV lasers are registered.