



University of Toledo Laboratory Design Guidelines

For any new construction or renovation of laboratory areas, consider health, safety and

room for temporary storage of materials before and after processing. Autoclave drainage should be designed to prevent or minimize flooding and damage to the floor.

For laboratories using radioactive materials: (Consult with Radiation Safety)

Eating and drinking areas should be physically separate (closable door) and conveniently located.

Allow for security of laboratory and materials.

Consider designing the lab to allow separation of radioactive materials use from other laboratory activities.

B. Furniture and Fixtures

Work surfaces should be chemical resistant, smooth, and readily cleanable, such as chemical-grade Formica.

Work surfaces, including computer areas, should incorporate ergonomic features, such as adjustability, appropriate lighting and equipment layout.

Benchwork areas should have knee space to allow room for chairs near fixed instruments, equipment or for procedures requiring prolonged operation.

Handwashing sinks for particularly hazardous chemicals or biological agents may need hands free operation

Wet chemical laboratories and darkrooms should have solvent resistant covered flooring using sheet goods rather than tile, particularly in areas where fume hoods are located.

Do not install more sinks or cupsinks than are necessary. Unused sinks may develop dry traps, resulting in odor complaints.

Sink faucets and hose bibs that are intended for use with attached hoses are provided with back siphon prevention (vacuum break) devices.

C. Storage

Cabinets for chemical storage should be of solid, sturdy construction. Hardwood or metal shelving is preferred. Some may require ventilation.

Materials of construction should be carefully considered where corrosive materials will be stored, e.g., corrosive-resistant liners or trays on shelves, location away from copper fittings, etc.

Allow space within the building for any central chemical and biological or radioactive waste storage needs.

Wall shelving should have heavy-duty brackets and standards and should be attached to studs or solid blocking. For office spaces, bookcases are preferable to wall-mounted shelving.

Flammable liquid storage needs should be defined in advance so that the laboratory may have space for a suitable number of flammable storage cabinets.

Flammable liquid storage (Class 1 Flammables) is not allowed below grade or near a means of egress, per the Uniform Fire Code.

Flammable storage cabinets should not be vented unless there is a significant odor or vapor control concern.

Laboratories using corrosive liquids should have ample storage space low to the floor, preferably in low cabinets, such as under fume hoods.

Allow space for the variety of waste collection containers needed. Depending on the

Semi-conductor, Photovoltaic and other hazardous gases (e.g., silane, hydrogen fluoride, chlorine, etc.) must be placed in vented gas cabinets and utilize stainless steel or coated duct work when corrosive gasses are used.

Hoods for perchloric acid require stainless steel construction and a wash-down system and a dedicated, isolated fan.

Hoods requiring filters (such as those for some radioisotopes or biological materials) should be designed and located such that filters may be accessed and changed easily.

Provisions should be made for local exhaust of instruments, gas cabinets, vented storage cabinets or other operations requiring local ventilation.

Single vertical sliding sashes are preferred and na1 0 u.(p)-3(e)-00912 ing45 748 p1TQ833(tilat)

Cryogenic liquid tanks should be placed away from below grade areas where dense vapors may collect and away from glass doors or windows.

Avoid using flooring options that do not respond well to cold or hot temperature extremes.

A phone should be placed near any loading area.

G. Utilities

BIOSAFETY LABORATORIES

A. Scope

The design and construction of a facility that contributes to efficient and safe work with biohazardous materials is the goal. Before a proposed biosafety containment laboratory can be effectively planned, a risk assessment determines the containment conditions that are required. Risk assessments, conducted on a case-by case basis, consider the biohazardous materials, the nature of the work, procedures involved, equipment needs, regulatory requirements, national guidelines, and safety and health requirements. The guidelines presented here are for general-use Biosafety Containment Levels 1, 2, and 3 for biological research laboratories. Containment facilities for animals, large-

2. Two biosafety cabinets should not be installed directly opposite each other when they are closer than six feet apart. Laminar airflow is greatly hindered by the concurrent operation of two biosafety cabinets situated across from each other. The potential for air turbulence also increases when two cabinet operators are working at the same time in the same immediate vicinity.
3. Do not design BSCs to be plumbed with natural gas; this is prohibited.
4. Biological Safety Cabinets (BSC) shall be installed as follows:
 - a) Class II, Type A2 BSC for biohazard work not involving chemicals; shall be directly

9. Where BSC are connected to external ducts, a flow monitoring system with audible and visual annunciators shall be used to alert the BSC of loss of external ventilation. Alternatively, thimble connections or canopy mini-enclosures in BSC shall be fitted with a ribbon streamer or equivalent attached at an edge through which air enters the device to indicate the airflow direction.
10. Security measures shall be designed and installed to meet or exceed the conditions set forth in the CDC-NIH Biosafety in Microbiological and Biomedical Laboratories
11. The Biosafety Officer must approve The BSC make and model prior to procurement.

Updated: 2023

The University of Toledo
Laboratory Planning and Design Quick Review Checklist

| | | |
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| Fire protection | Yes | No |
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| Are provisions in place for adequate illumination for sufficient visibility? | | | | Provide sufficient illumination. |
| Are chemical resistant sinks installed for handwashing? | | | | Hand washing sinks should be located within all BSL2 labs. There should also be a sink in close proximity to the laboratory door exiting the space. |
| Lab furniture | Yes | No | N/A | Required Actions |
| Are provisions made to construct all working surfaces such as benches and counters with sturdy and chemical resistant materials? | | | | All furniture should be capable of supporting the anticipated loading. |
| Is the furniture designed to be cleanable and with basic ergonomic specifications | | | | Fabric materials on furniture such as chairs shall not be used in laboratories. |
| Chemical Storage | Yes | No | N/A | Required Actions |
| Will flammable liquid storage cabinets be provided for storage of flammable liquids. | | | | Cabinets must be UL listed ETQq93S8.63 352.26 |

