# Building Design Guidelines
(EHS Program Manual 8.2)

## 1.0 Overview

Environmental Health and Safety (EHS) at Weill Cornell Medicine (WCM) has developed this Building Design Guidelines program for all new construction and renovation projects. These guidelines are updated regularly; the newest version is available on the EHS website or by requesting a copy from EHS.

**Capital Planning and Engineering and Maintenance (E&M) Project Managers must ensure the newest version of this program is used at the beginning of every project.**

## 2.0 Table of Contents






Weill Cornell Medicine
Environmental Health and Safety
TEL 646-962-7233 WEB weill.cornell.edu/ehs EMAIL ehs@med.cornell.edu
Weill Cornell Medicine | 402 East 67th Street, Room LA-0020 | New York, NY 10065

## 3.0 Objective

This program aims to provide guidance to designers in incorporating important safety and regulatory compliance issues into the design and construction of spaces at WCM. The items addressed in this manual represent design issues and challenges addressed on previous projects.

Since the spaces at WCM have multiple variations and complex facets, this manual does not address all possible safety and compliance issues and should be used as a guide in conjunction with EHS review of design documents. Architects and engineers must meet all local, state, and federal codes and design requirements. This manual in no way alleviates the requirement to comply with any regulatory code.

## 4.0 Applicability

The Building Design Guidelines program applies to all spaces designed, constructed, or renovated for WCM, both on and off campus locations.

## 5.0 Responsibilities

### 5.1 ENVIRONMENTAL HEALTH AND SAFETY (EHS)

EHS duties include:

- Review designs for all new construction and renovation projects for safety and regulatory compliance.
- Provide comments to Capital Planning / E&M Project Managers on any safety or compliance issue found during design reviews.
- Work with the Capital Planning/E&M Project Managers to resolve all design issues.
- Evaluate final construction documents to ensure all safety issues have been resolved.
- Communicate changes and provide guidance to E&M, Capital Planning, and other members of the WCM community.
- Maintain the EHS Building Design Guidelines and update on periodically to include requirements from updated codes and regulations.

### 5.2 CAPITAL PLANNING/ENGINEERING & MAINTENANCE PROJECT MANAGERS

Project Managers for Capital Planning and/or Engineering and Maintenance must:

- Obtain the newest version of this manual prior to the start of a project.
- Provide design professionals with a copy of this manual.
- Monitor project design and ensure applicable guidelines from this manual are incorporated into the design and construction of all WCM facilities (both onsite and off-site locations).
- Supervise construction and ensure applicable guidelines are being integrated into the final construction of spaces.
- Provide a minimum of one half-sized set of drawings with all phases of design for EHS review.
- Review design comments issued by EHS.
- Work with EHS to resolve all design issues.

## 6.0 Life Safety Guidelines

### 6.1 EGRESS AND CORRIDOR DESIGN

**Design considerations must ensure that all spaces maintain safe egress conditions and proper clearances post-occupancy.** These concerns may affect the location of equipment (e.g., refrigerators, freezers, cabinets, shelving units) as well as the overall design.

**Corridor storage of any kind is not permitted under any circumstance.**

#### 6.1.1 Public Egress Corridor Storage

- Storage in public egress corridors is prohibited for new construction or renovation projects.
- Adequate storage must be provided within the footprint of the project without compromise.

#### 6.1.2 Elevator Lobbies

- Unobstructed egress must be maintained from elevator lobbies to fire stairwells.
- Enclosed elevator lobbies cannot have locking doors without prior EHS approval and appropriate measures in place to permit safe egress from the lobby.

#### 6.1.3 Interior Central Egress Pathways

Interior central egress pathways are the primary routes within a space that lead to public egress corridors and/or stairwells.

- The central egress pathways must be designed to maintain adequate egress clearance.
- Equipment stored in central egress paths should be organized to one side of the path to promote a straight egress out of the space, avoiding a “zigzag” egress path.

#### 6.1.4 Entry Doorways and Alcoves

- Equipment must not be placed near entry doorways and alcoves leading to public egress corridors.
- Cylinders/cryogenic units must not be located near doors or in areas that may prevent safe egress.

#### 6.1.5 Secondary Egress from Laboratories

- Laboratories greater than 1,000 square feet require a secondary means of egress.
- Any adjacent laboratory can be considered a second means of egress if it is not a higher hazard.

## 6.2 FIRE ALARM SYSTEMS

**The design and installation of fire alarm systems and components must be coordinated with EHS.**

### 6.2.1 Fire Alarm Control Panel

- **Approved Equipment:** An Edwards EST3 fire alarm control panel is required. Any alternative manufacturers must be approved in writing by EHS.
- **Central Station Transmitter:** Fire alarm control panels must have an integrated central station transmitter.
- **Device Descriptions:** EHS must receive a list of proposed point descriptors for review before point descriptions are finalized.
- **Location:** Fire alarm control panels must be located in building lobbies or at the entrances to a space. A review must be conducted with EHS prior to finalization of the panel location.
- **Programming:** The installing fire alarm vendor is required to provide the software disk or USB drive with the final panel programming.
- **Remote Annunciator:** Buildings with multiple street entrances and/or lobbies must have a remote annunciator installed at the entrances that do not have the main fire alarm control panel. The design must be reviewed with EHS.

### 6.2.2 Printer

**A fire alarm printer must be added for all new fire alarm installations.** The printer must be located adjacent to the panel and should not be in remote locations.

- **Approved Devices:** Keltron 90 Series Fire Alarm Printer.
- Edwards System Event Printer (PT-1S) is preferred in buildings where WCM will maintain a manned security desk in the immediate area of the fire alarm panel.

### 6.2.3 Fire Alarm Initiating Devices

- **Smoke Detectors:** Where allowable by code, photoelectric smoke detectors must be specified instead of the ionization type. Smoke detectors must meet the requirements of UL-268 as applicable.
- **Duct Detectors:** Duct detectors specified are to be SIGA-DH Type Duct Detector Assembly or other metal assembly unit. These units tend to resist condensation, which causes false alarms.
- **Labeling:** All smoke detectors, duct detectors, and modules must be labeled with a P-Touch style label with the logical address of the device.
- **Accessibility:** Smoke detectors must be generally accessible directly from a ladder or scissor lift for maintenance.

### 6.2.4 Sequence of Operations

An 8.5” x 11” sequence of operations must be provided to EHS for fire alarm panel installations.

### 6.2.5 Keying

All newly installed keyed fire alarm devices (e.g., pull stations, panels) must be keyed to a Cat 45 key.

### 6.2.6 Manuals

**EHS must receive all operations and maintenance manuals for all newly installed fire alarm systems.**

Two sets of 11” x 17” fire alarm plans with device locations and logical addresses must be turned over to EHS prior to acceptance of the fire alarm system. Digital copies in PDF format are also acceptable.

### 6.2.7 Fire Procedure Box

**A fire alarm procedure box must be placed next to all newly installed fire alarm panels. This box will be used to store the required procedures and testing/maintenance logs.** The box must have a lock keyed to a Cat 45 Key (available from manufacturer).

- **Approved Devices:** Safety Media Inc. Fire Safety Plan Box Common or Stainless Steel.

### 6.2.8 Training

**The system installer must train EHS staff on the operation of all newly installed fire alarm systems.** The installer must provide a video copy of the training on CD, DVD, or in other approved digital form.

## 6.3 FIRE PROTECTION SYSTEMS

Newly installed fire protection systems must address the requirements described below.

### 6.3.1 Access

**All valves located at a height greater than 6 feet require a permanent ladder for access.** Instead of a ladder, chain-operated mechanisms are permissible on standpipe control valves.

### 6.3.2 Fire Hose Covers

All newly installed fire hoses must have fire hose covers.

### 6.3.3 Painting

All sprinkler/standpipe control valves and exposed piping must be painted as mandated by Local Law 58 of 2009.

### 6.3.4 Replacement Sprinkler Heads

All new building installations must have replacement sprinkler heads, and the wrench used for each type of installed sprinkler heads.

### 6.3.5 Pre-Action Systems

**Pre-action sprinkler systems are not permitted on the WCM campus.**

If a specific need is identified for a pre-action system, it must be discussed and approved in writing by EHS.

### 6.3.6 Specialty Extinguishing Systems

The need for specialty fire protection and extinguishing system (e.g., dry pipe, kitchen hood) must be reviewed with EHS early in the design phase; as well as its design and installation. A standard wet pipe sprinkler system is preferred if the code allows.

Project managers should provide:

- **Sequence of Operations:** an 8.5”x 11” sequence of operations for all newly installed systems.
- **Manuals:** operations and maintenance manuals for all newly installed systems.
- **Training:** training for EHS and E&M staff on the operation of all newly installed systems.

### 6.3.7 Sprinkler Head Cages

Sprinkler head cages must be installed on:

- All sprinkler heads located in mechanical spaces as well as all

Exposed heads in areas where they may be impacted by maintenance work or general occupancy.

### 6.3.8 Sprinkler Head Density

Ductwork and equipment in mechanical spaces may affect sprinkler head coverage. These factors must be considered to ensure adequate sprinkler coverage is installed in these spaces, including layered sprinkler protection if necessary.

## 6.4 CARBON MONOXIDE MONITORING SYSTEMS

In facilities where carbon monoxide producing equipment, parking garages or loading docks exist, compliance with LL 191-2018 and Section BC-908 of the 2014 Building Code is required as applicable.

# 7.0 Emergency and Safety Equipment Guidelines

## 7.1 EYEWASH UNITS

**Suitable facilities for quick drenching or flushing of the eyes must be provided within the work area for immediate emergency use where the eyes or body of any person may be exposed to injurious or corrosive materials.**

An easily accessible eyewash/drench hose unit must be located at every sink within a laboratory, as well as support laboratory areas (e.g., tissue culture rooms). Locate eyewashes so that the maximum distance from the hazard does not exceed 100 feet and so that they can be reached within 10 seconds. Highly corrosive chemicals require the eyewashes to be within 10-20 feet of the hazard.

All eyewash units installed at WCM must meet the most current version of ANSI, Z358.1 in addition to the following minimum guidelines.

- Hand-held drench hoses may be used in conjunction with safety shower/eyewash stations. However, drench hoses are not a substitute for safety shower/eyewash stations.
- The areas around the eyewash must be well lit and highly visible.
- Eyewashes that are part of safety shower combo units must be plumbed directly to a drain line. Eyewash units are not permitted to drain onto the floor. “Daylight” drains are not allowed.
- In areas undergoing a partial or cosmetic renovation, eyewashes must be upgraded to meet the requirements of this section.
- The water temperature must be tempered (i.e., between 60 – 100°F).
- Eyewash units must be positioned between 33 inches to 45 inches from the floor, and at least 6 inches from the wall or nearest obstruction.

### 7.1.1 Approved Equipment

- **Sink-Mounted Eyewash:** Watersaver EW1022.
- **Recessed Combo Unit:** Watersaver SSBF2150.
- **Combo Unit:** Watersaver SS902.

## 7.2 SAFETY SHOWERS

**Safety showers must be available within the work area for quick drenching of any person who may be exposed to injurious or corrosive materials.**

Showers must be no more than 100 feet or 10 seconds from the hazard. Highly corrosive chemicals require the showers to be within 10-20 feet of the hazard. Areas where more than 5 gallons of corrosive acids or 5 gallons of flammable liquids are stored or used must have an emergency shower within 25 feet and line of sight of the room door.

All safety showers installed at WCM must meet the most current version of ANSI, Z358.1 in addition to the minimum guidelines below.

- The safety showerhead must be a semi-recessed model; showers recessed into the ceiling are not allowed.
- Electrical outlets and equipment are prohibited within 36 inches of the safety shower unless approved by EHS.
- The distance from the floor to the shower must be between 82 – 96 inches.
- A wall cord, ring, and chain, or pull bar (located no higher than 48 inches from the floor) may activate the shower. The activating device must be located, so it is not in the way of regular occupant activity to prevent accidental discharge.
- The area around the shower must be well lit and highly visible.
- A different color tile or inlaid lines must designate the floor area.
- A clearly marked and readily accessible shutoff valve must be located within 5 feet of all showerheads.
- Water for safety showers must be tempered (i.e., between 60 – 100F degrees).

### 7.2.1 Privacy Curtain

**All safety showers must have a privacy curtain to ensure that employees remove contaminated clothing during an emergency that requires its use.** Privacy curtains may be recessed into the wall.

### 7.2.2 Approved Equipment

- **Safety Shower Head:** Watersaver ES658.
- **Recessed Combo Unit:** Watersaver SSBF2150.
- **Combo Unit:** Watersaver SS902.

## 7.3 FIRE EXTINGUISHERS

**Fire extinguishers must be included in the design for all spaces and provided by all projects.**

- A carbon dioxide or other clean agent fire extinguisher must be provided in areas with costly equipment that can be damaged by ABC extinguishers.
- Areas in which high voltage or sensitive equipment are in use (e.g., elevator machine rooms) must have at least one CO2 extinguisher.

### 7.3.1 Laboratories

- At a minimum, one 10-pound ABC fire extinguisher must be posted within the door to the laboratory (including laboratory procedure rooms).
- **Extinguishers must be located so that no point in the laboratory is further than 50 feet from an extinguisher.**
- The use/storage of alkali metals (e.g., metallic sodium) requires a dry graphite extinguisher, not dry powder. Only dry graphite can extinguish an alkali metal fire; all other extinguishing agents react violently with burning metals.

### 7.3.2 Fire Extinguisher Cabinets

**All fire extinguishers must be placed in fire extinguisher cabinets.**

Cabinets must meet the following criteria:

- Recessed into the wall.
- Capable of accommodating a 10-pound ABC extinguisher.
- Not lockable.
- Not alarmed.

### 7.3.3 MRI Areas

**All MRI areas have non-ferrous, MRI-safe fire extinguishers.**

- **MRI-safe 5 lb. Carbon Dioxide ($CO_2$) type fire extinguishers are required if the extinguisher is located within an MRI equipment mechanical room, Zone 3 or Zone 4.**
- **MRI-safe ABC type fire extinguishers are required if the extinguisher is located in Zone 1 or 2 of the MRI suite.**

## 7.4 SAFETY HAVEN

The Safety Haven is the central location for safety equipment and materials. **A Safety Haven must be included in each laboratory unit, mechanical equipment room, or any environment where hazardous materials will be stored or known hazardous conditions exist.**

While only one safety haven is required, additional safety equipment may be required throughout the lab to meet the requirements of specific hazards.

### 7.4.1 Placement

**Safety Havens should be located at entrances or exits to each laboratory or control unit.** Safety Havens may not be located in dead-end corridors or at the back of a space. EHS must approve placement of Safety Havens in all spaces.

### 7.4.2 Floor Designation

Floor markings or inlays should be included to designate the Safety Haven and to promote no storage or blocking of safety equipment.

### 7.4.3 Consistency

All Safety Haven locations should have all of the same components and be of a similar layout.

### 7.4.4 Signage

V-Fold signs must be included to denote equipment location. Refer to the Signage section for specific fire extinguishers, eyewashes, and safety showers V-fold signage requirements.

### 7.4.5 Minimum Components

- Fire Extinguisher.
- Safety Shower.
- Eyewash.

### 7.4.6 Additional Required Components for Laboratories

- **Chemical Spill Kit Cabinet:** A chemical spill kit cabinet is required for all laboratory Safety Havens. This space may be a cabinet or a small 'cubby-hole' like area. The minimum inner dimensions are 18 inches tall by 25 inches wide by 10 inches deep.
  - **Approved Equipment:** Brady Hazwik Portable Economy Spill Kit.
- **Bulletin Board:** A small bulletin board with a locking glass front should be included in the design. The bulletin board will contain emergency contact information, policies, procedures, and Certificates of Fitness.
- **Binder Storage:** A recessed shelf should be included to store approximately three 3" binders. The binders will hold safety information including manufacturer safety data sheets (MSDSs), safety manuals, and additional laboratory safety and chemical spill response procedures. The shelf should have signage that reads "Safety Information".

***Note:** Additional components not listed above (e.g., security panic button, chemical hood emergency purge) may be integrated into the Safety Haven but should be discussed with EHS.

# 8.0 Hazardous Materials Guidelines

## 8.1 CHEMICAL STORAGE

### 8.1.1 Chemical Storage Under Sinks

**Chemical storage is not permitted underneath sinks.**

### 8.1.2 Chemical Storage Below Chemical Hoods

- Chemical hoods must have ventilated base cabinets that comply with NFPA 30, with a built-in partition for the separation of incompatible chemicals and secondary containment.
- Corrosive storage cabinets can be associated with chemical hood storage cabinets, following the criteria detailed in Section 8.1.4 below (e.g., one cabinet for acids/corrosives and one cabinet for flammable liquids).

### 8.1.3 Flammable Liquid Storage

- Vented flammable storage cabinets must be provided for storage of flammable materials in laboratories. These cabinets are usually installed under chemical hoods.
- Flammable storage cabinets must be mechanically ventilated and may be tied into the chemical hood ventilation.

### 8.1.4 Corrosive Chemical Storage

- Poly-lined corrosive storage cabinets must be provided for laboratories that will store corrosive materials.
- Cabinets must be mechanically ventilated.

### 8.1.5 Water Reactive Chemicals

**Water reactive chemicals must be stored in suitable receptacles or enclosures with adequate labeling to protect them from contact with water.**

### 8.1.6 HPLC Specialty Equipment

Laboratories that will operate a High-Performance Liquid Chromatography (HPLC) must have a workstation to avoid storage of waste bottles on the floor. For example, the waste bottles can be stored in the cabinet space below the HPLC. The cabinet would then have an access hole/cut-out that allows the HPLC drain lines to reach the waste bottles.

### 8.1.7 Piped Chemical Systems

All plumbed systems that move chemicals from one area to another must meet all applicable standards and codes for these systems. All piping must have adequate labels with the contents of the system.

## 8.2 COMPRESSED GASES

The minimum design requirements for compressed gases are described below. Additional permitting may be required for compressed gases and manifolds for laboratories. Consult Section 16.0 - Documentation and Regulatory Permitting for additional requirements.

### 8.2.1 Flammable Gases

- Flammable gas use is not permitted in any laboratory unit where the floor is located below grade. Flammable gases must be stored in storage rooms located at or above grade level.
- Flammable gas must be separated from acids, chemicals, and oxidizing gases.

### 8.2.2 Cryogenics

- **Cryogenics cannot be stored at or near the entrances or exits.** An area must be allocated within the room for storage and use of cryogenics.
- Areas where cryogenics are dispensed over 60 gallons require an oxygen sensor.
- The oxygen sensor must provide continuous monitoring and have an audible alarm.
- The oxygen sensor must alarm if oxygen content drops to or below 19.5%.
- In areas where the alarm may be inaudible, an additional strobe/horn unit must be added to improve clarity.
    - **Approved Devices:** PureAire Aircheck O2.

Consult EHS for more information, or for a fact sheet on oxygen sensor.

### 8.2.3 Toxic and Pyrophoric Gases

- Continuously mechanically vented gas cabinets are required for toxic and pyrophoric gas cylinders larger than lecture size and in use.
- Pyrophoric gas cabinets must have sprinklers.

### 8.2.4 Restraints

- Compressed gas cylinders must be adequately secured in a safe and upright position.
- Cylinders must not be attached to plumbing or electrical conduits.

### 8.2.5 Manifolds (House Gas Systems)

- **All compressed gas manifolds or house gas systems must have central shut off valves.** Valves should be located near the entrance or exit of each laboratory or near fire stairwells.
- All gas outlets must have a regulator and gauge installed at the point of use to show outlet pressure.

- All dual-outlet gas valves must have independent controls.
- Manifold piping must have labels compliant with all applicable standards.
- Mechanical ventilation must be provided for all gas closets and manifold rooms as per the NYC Fire Code and Mechanical Code.

## 9.0 Heating Ventilation and Air Conditioning (HVAC) Guidelines

**General room ventilation must be provided in all occupied spaces.**

Design professionals and or/engineers must develop design criteria for the HVAC system in all new and renovated spaces.

### 9.1 VENTILATION RATES

**Ventilation rates must be adequate for the intended use of the space.** EHS will assess ventilation rates during design reviews.

### 9.2 VENTILATION SETBACKS

Ventilation setbacks are permitted.

In laboratories, EHS must review the method for determining occupancy for ventilation setbacks. Laboratory ventilation needs to stay balanced and remain under negative pressure even during the setback.

### 9.3 LABORATORIES

A general room ventilation system must be designed to maximize the clearance of contaminants from the room while minimizing overall energy use. Ventilation recommendations detailed in the ASHRAE Laboratory Design Guide: PLANNING AND OPERATION OF LABORATORY HVAC SYSTEMS should be followed to protect the integrity of the laboratory environment.

Other considerations include:

- **Supply air must be properly balanced with chemical hood exhaust in each room.** Supply air must be slightly less than exhaust air to allow for laboratory rooms to be under negative pressure at all times. Hallways and stairways should be pressurized to produce negative pressure in a laboratory room.
- **Laboratory ventilation systems cannot recirculate air from a laboratory to any other part of the building.** All laboratory air must be exhausted directly to the outside of the building.

### 9.4 HEAT LOAD

Standalone cooling systems should be considered in areas where the heat load exceeds the required ventilation rate.

## 10.0 General Design Guidelines

### 10.1 ELECTRICAL

- **Electrical Panels:** All electrical panel breakers must be appropriately marked and identify the service they control. In case of a fire, the fire department and/or E&M personnel must be able to clearly determine how to control each feeder, branch, or circuit originating on a switchboard or panel.
- **Ground Fault Circuit Interrupters (GFCI):** Electrical outlets within 6 feet of all wet areas (i.e., sinks, showers, ice flakers, etc.) must be GFCI protected. All outlets tied into a central GFCI or a GFCI breaker must be labeled at the outlet as “GFCI Protected”.

## 10.2 PAINTS AND COATINGS

**All paints, adhesives, and floor coatings must be latex-based and/or low Volatile Organic Compounds (VOC) unless pre-approved by EHS.**

Project Managers must submit Safety Data Sheets (SDS) and product information for all non-latex based products for approval by EHS prior to use on-site.

## 10.3 FIRE-RATED PENETRATIONS AND OTHER OPENINGS

**All holes and penetrations through fire-rated walls must be properly sealed with a fire-rated stopping (i.e., heat resistant) material.** Any penetrations, holes, or other openings between floors, rooms, and shafts found or caused during construction must be permanently sealed. Plumbing from existing floor drains must be removed, cut, and capped.

### 10.3.1 Professional Certification

**A Professional Engineer (PE) or Registered Architect (RA) retained by the contractor must provide an affidavit that the fire-rated walls were properly repaired.** The PE or RA may require that the fire-rated stopping material used to seal the penetrations be available for inspection.

## 10.4 DOORS AND GLASS PANELS

- Viewing panels are required in all doors with the exception of bathrooms, mechanical/electrical rooms, closets, and private offices.
- All full-panel (i.e., floor to ceiling) glass and glass doors must have a design, etching, or frosting to ensure that glass is visible.
- All electronically locked doors must be fail-safe. EHS must evaluate requests for fail-secure doors, and must approve them in writing.
- All magnetic locks must be tied into a building's fire alarm system and be fail-safe in the event of a fire emergency. Project teams must discuss the implementation of all magnetic locking devices with EHS, as they can present a serious safety hazard to building occupants if not appropriately designed.
- All glass panels, glass doors, and glass viewing panels in doors that are part of a fire-rated wall must be fire-rated, and UL approved. This information must be stamped on each individual piece of glass installed in a laboratory.
- Laboratory doors must be self-closing and lockable.

## 10.5 FURNITURE

- All chairs inside laboratory rooms (including office workstations) and clinical areas must be able to be easily decontaminated (e.g., vinyl surface).
- Workstations must be ergonomically designed.

## 10.6 CURTAINS AND DRAPES

**All curtains and drapes installed in areas of public assembly (lecture halls, classrooms), exam rooms, laboratories, common areas (lobbies, waiting rooms), and any area other than private administrative offices are must be inherently flame-resistant or flame-proofed.**

An affidavit must be provided by an FDNY C-15 Certificate of Fitness holder, stating that the material is inherently flame-resistant or has been treated to be flame-resistant, and has been tested to the requirements of NFPA 701. This affidavit must be provided to the user group, and a copy must be issued to EHS prior to occupancy.

These requirements do not apply to metal or vinyl blinds.

### 10.7 ADJUSTABLE SHELVING AND OPEN CABINETS

**The NYC Fire Code mandates that for all spaces with sprinklers, a minimum clearance of 18 inches between the sprinkler head and all other objects not stored at the perimeter of the room must be maintained.** This regulation ensures that fire sprinkler coverage is not disrupted by materials on open shelves.

**All open shelving away from the perimeter of the room and under or near sprinkler heads must be designed so that the maximum height of a shelf is no closer than 36 inches from the sprinkler head.**

## 11.0 Access and Guarding Guidelines

**Structures and equipment must be designed and installed to allow for safe access, and guard or eliminate all safety hazards to staff that accesses or maintains the equipment.**

**Any piece of equipment, structure, or area that will be accessed (e.g., for maintenance or repairs) must not present users with a fall hazard of four feet or greater.**

**In the event a fall hazard is unavoidable, fall protection devices must be integrated into the design.**

Guarding must also be in place on all mechanical equipment to prevent injuries to employees involved in servicing and maintenance of equipment with moving parts.

### 11.1 FIXED LADDERS

- All fixed ladders must be designed as mandated by applicable OSHA (29 CFR 1910.27) and ANSI (A14.3-2002) standards.
- All fixed ladders for maintenance purposes in public areas (e.g., public hallways) must be guarded to prevent unauthorized use.
- Ladder guards must be locked. Locks should be coordinated with E&M.

### 11.2 WALKING AND WORKING SURFACES

- Walking surfaces, guardrails, and toe boards must be installed where employees would be exposed to falls of four feet or greater while accessing equipment, shafts, etc.
- Standard railings with standard toe boards must be installed on all exposed sides except at the entrance of the elevated landings.
- The railings and toe boards must be constructed as required by OSHA and ANSI (A1264.1).

### 11.3 SKYLIGHTS

- Skylights must be designed and constructed to not present a hazard to anyone on any roofs.
- All new skylight installations must have a skylight screen or fixed guardrail. Consult regulations in OSHA 1910 Subpart D Walking-Working Surfaces for more information on the construction of skylight screens or standard railing.

### 11.4 ANCHORAGE POINTS/FALL ARREST SYSTEMS

- Permanent fall arrest anchor points and personal fall arrest systems must be integrated to provide fall protection for a structure where standard railings and other fall protection measures are not feasible.
- Anchorages must be capable of supporting at least 5,000 pounds of force per employee. An affidavit for all anchor points must be provided to certify each is rated to support the intended weight.

### 11.5 GUARDING

- Fans shall be designed and positioned to provide full access to employees for maintenance and service activities. Consult OSHA 1910 (Subpart O) for more information on the design and construction of guards.

- All equipment with moving parts (e.g., belts, drives) shall be appropriately guarded.

## 12.0 Signage

Projects are, at a minimum, required to provide the following signage when applicable.

### 12.1 FIRE DOORS

All fire doors should have the following signs:

- Doors designed to be kept open: “FIRE DOOR – DO NOT BLOCK”.
- Doors designed to be kept closed: “FIRE DOOR – KEEP CLOSED”.

### 12.2 FIRE PUMP ROOM

Fire pump rooms must be identified with red and white signs that state “FIRE PUMP ROOM”.

### 12.3 FIRE STAIRWELL DOORS

Fire stairwell doors must be labeled as required by all applicable codes; including stair designation, floor number on stairwell side, and floors to re-entry.

Floors located below grade should also have signage designating the number of floors to the street (i.e., “1 Floor Up to Exit”).

### 12.4 ELEVATOR LANDING

Elevators must be labeled as dictated by all applicable codes. **Signage displaying the elevator bank with a floor plan showing the nearest fire stairwells should be displayed at all elevator banks.** The signage should display all means of egress from the elevator location.

### 12.5 NO SMOKING SIGNS

**A sign prohibiting smoking must be conspicuously posted on the exterior of entrances to all buildings, chemical storage areas, and laboratory areas (including stairwell doors that open directly into a laboratory); and within such areas**.

### 12.6 SHAFTS

Doors, openings, and hatches to a shaft must be marked with a sign that reads “SHAFTWAY”. The lettering on the sign must be in red letters at least 6 inches high on a white background.

### 12.7 ELECTRICAL ROOMS

All doors leading into electrical closets or electrical control panel rooms must be marked with signage stating “ELECTRICAL ROOM”. Electrical closets must be designed in a way that they do not permit storage.

Signage stating “Use No Water” may be required for rooms with electrical equipment. Consult the NYC Building Code for more information on the requirements associated with this signage.

### 12.8 FUEL OIL SYSTEM

All high-fill alarms for fuel oil systems must have signage. Consult with EHS for approved wording for this signage. Signage will depend on the high-fill alarm utilized.

## 12.9 EMERGENCY/SAFETY EQUIPMENT

- **All emergency equipment (e.g., safety showers, eyewashes, fire extinguishers, fire hoses) must have signage designating its location.**
- Signs should be L-fold or V-fold.
- The signs should be affixed at each piece of equipment and mounted at approximately 84” above the floor.

## 12.10 PERMIT REQUIRED CONFINED SPACES

**Permit-Required Confined Spaces must have signage that states: “Danger – Confined Space Enter By Permit Only”.**

A Permit-Required Confined Space is a confined space that has one or more of the following characteristics:

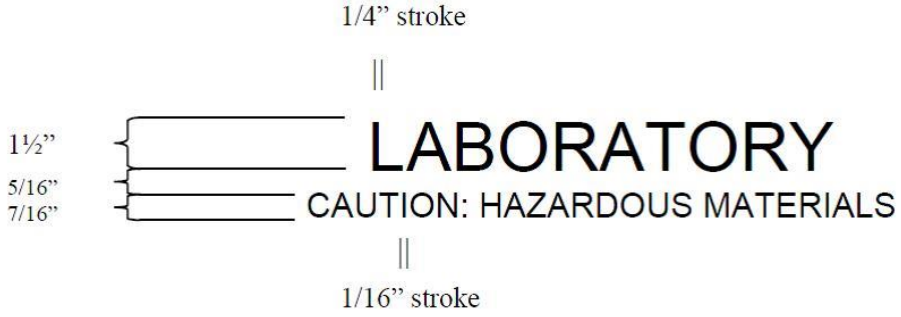
1. Contains or has a potential to contain a hazardous atmosphere;
2. Contains a material that has the potential for engulfing an entrant;
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor that slopes downward and tapers to a smaller cross-section; or
4. Contains any other recognized serious safety or health hazard.

## 12.11 SPRINKLER PROTECTION/PRE-ACTION SYSTEM SIGNAGE

Contact EHS to determine special signage requirements for sprinkler protection or pre-action systems.

## 12.12 LABORATORY CAUTION SIGN

- **FDNY mandates that a sign stating “LABORATORY – CAUTION: HAZARDOUS MATERIALS” be posted at the mid-point of all exterior doorways (including stairwell doors that open directly into a laboratory) leading into the chemical laboratory unit.**
- The sign must be metal or other durable material with red letters on a white background with the specified letter dimensions provided below.




## 12.13 COLD ROOMS WITH RE-CIRCULATED AIR (I.E., NO FRESH AIR SUPPLY)

**A sign reading “No Fresh Air Supply in this Room - No Extended Occupancy with Door Closed” must be posted on doors into cold rooms that do not have fresh air supply.**

## 12.14 HEALTH AND SAFETY DOOR SIGN HOLDERS

- **Each entrance to a laboratory from a public corridor or stairwell must have a Health and Safety Door Sign (HSDS) holder.**
- Interior laboratories or procedure rooms must also have an HSDS Sign holder.

- The HSDS sign holder/frame must accommodate 8.5 x 11-inch sized paper.
- The HSDS holder must be centered 2 inches below the official room number placard.

### 12.15 MRI QUENCH VENT DISCHARGE

Where an MRI vent system for quenching discharges onto an accessible roof or into an accessible space, caution signage must be provided and posted at the entry to such locations. If these locations are likely to be occupied by other than E&M personnel, additional physical barriers may be required in the immediate area of the vent point of discharge.

## 13.0 Laboratory Design Guidelines

The laboratory design guidelines of this section must be addressed in addition to all applicable general design guidelines in the previous sections for all laboratory designs.

### 13.1 GENERAL DESIGN REQUIREMENTS

Laboratory Facility layouts must meet the following requirements:

1. Laboratory doors should be self-closing and have locks as required by institutional policies.
2. Laboratories must have a sink for hand washing. The sink may be manual, 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.

#### 13.1.1 Laboratory Waste Storage Areas

- **Laboratories cannot place regular trash (i.e., bags and cardboard) in public egress corridors.**
- All waste must be stored within the laboratory near the entry doorway and alcove.
- The alcove dimensions must accommodate the need to allow wastes by the entry doorway, while not restricting egress clearance.

#### 13.1.2 Laboratory Support Rooms

- Non-laboratory spaces located within the laboratory encourage food and drinks to be brought into the laboratory, which is prohibited.
- **Offices, computer rooms, and staff work areas should not be located within a laboratory when possible.**
- Bathrooms should be located to ensure that non-laboratory personnel does not have to walk through a laboratory to get to the bathroom.

#### 13.1.3 Break Rooms

**Eating and drinking within laboratories are forbidden. Break rooms, conference rooms where food or drink will be consumed, and other areas where food and drink are normally consumed may not be located within a laboratory or laboratory suite.**

**Note:** Open food and drink containers cannot be carried through a laboratory to an office, conference room, or break room.

### 13.1.4 Tissue Culture Rooms

Tissue culture rooms are designated Biosafety Level 2 (BSL2) and must meet the following requirements:

- Floors must be made of a material that can be easily cleaned and disinfected.
- Cabinets must be closable.
- UV lights are not permitted.
- All tissue culture rooms must be separated from the corridor or lab by a door and have a hand washing sink with eyewash available inside the room.
- Piped services: Vacuum, compressed air, no fan coils in tissue culture room.
- HVAC Requirement: Relative pressure- Negative to corridor.

### 13.1.5 Biohazardous and Medical Waste

- Sufficient floor space must be allocated to store biohazardous waste within secondary containers near the entry doorway and alcove.
- A method for decontaminating laboratory wastes (e.g., autoclave) must be evaluated for all laboratory facilities. EHS and the user group must be consulted in determining the specific decontamination needs for lab users.

### 13.1.6 Laboratory Sinks

- **A handwashing sink must be available in all laboratories.**
- Unobstructed access must be maintained to hand washing sinks. Areas separated by doors must have additional sinks within.
- Laboratory sinks must be located near exit doors where possible.
- **Cup sinks are prohibited in all laboratories.** User requests for cup sinks must be evaluated and approved by EHS. If approved by EHS, special design requirements may apply (e.g., lip or berm to contain chemical spills).

### 13.1.7 Floor Drains

- **Floor drains are prohibited in laboratories and hallways adjacent to laboratories to prevent chemicals from migrating into a building's plumbing system, and the potential release to the environment in the event of a chemical spill.**
- Equipment (e.g., ice flakers, cold rooms) that drains condensate should be plumbed directly to a drain line.
- Should a floor drain need to be installed to accommodate a piece of equipment, a berm or curb must be installed around the drain.

### 13.1.8 Glass Panels, Doors, and Viewing Panels

- All glass panels, glass doors, and glass viewing panels in doors that are part of a fire-rated wall must be fire-rated, and UL approved. This information must be stamped on each individual piece of glass installed in a laboratory.
- Appropriate wire glass may also be installed.

## 13.2 MEDICAL WASTE AND RED BAG CONTAINERS

**EHS must review and approve all red bag and medical waste containers for clinical spaces due to the need to comply with strict regulatory requirements.**

Red bags and red bag waste, (i.e., Regulated Medical Waste) must be placed in containers that are closable, durable, and leak-proof with the appropriate biohazardous waste symbol.

## 13.3 CHEMICAL STORAGE REQUIREMENTS

The flammable and combustible storage needs of the end users must be considered early in the design phase.

**The FDNY limits the maximum volume of chemicals that can be stored in the laboratory unit based on the fire rating of the laboratory's enclosure, and whether the laboratory has a sprinkler system.** The density and total quantity of flammable and combustible liquids allowed within a laboratory unit will depend on the filing of the space and the applicable building codes. The design professional must calculate the maximum allowable quantity based on the applicable code. Consult EHS for clarification on total storage limits and volume.

**Intended allowable quantities of flammables should be listed on design drawings for all laboratory spaces.**

## 13.4 CHEMICAL HOODS

- **Sinks are prohibited in chemical hoods unless approved by EHS.**
- A sash stop must be provided at a maximum of 18 inches from the work surface in the open position.
- Chemical hood sashes must be made of a single pane without additional sliding windows unless approved by EHS.
- Filters, including carbon and pre-filters, are only required for chemical hoods that will be used for iodination. Contact the Health Physics Office for more information.
- If heated perchloric acid will be used in the hood, contact EHS for specific requirements.
- For chemical storage below hoods refer to Section 8.1- Chemical Storage.
- An ASHRAE 110 certification is required for all new chemical hoods. Consult Section 16.0- Documentation and Regulatory Permitting Guidelines for additional requirements.

### 13.4.1 Placement

- **Chemical hoods must be located away from doors and windows that may be opened, principal traffic lanes, and room air outlets or returns which may cause drafts sufficient to interfere with their exhaust operations.**
- Laboratories with multiple chemical hoods must locate the hoods in a manner so that the chemical hoods do not adversely impact the performance of each other; for instance, hoods should not be adjacent to each other, or at 90º to each other.

### 13.4.2 Chemical Hood Ducting

**Exhaust ducts must have the minimum number of turns, bends, or obstructions as is practical; and have adequate air movement in the duct sufficient to prevent any back up into the hood.**

- Independent ducts must be provided for chemical hoods used for handling perchloric acids, strong oxidizing agents, or highly reactive chemicals.

### 13.4.3 Minimum Average Face Velocity Requirements

**With the sash height set at 18 inches, the chemical hood must operate with an average face velocity between 80 fpm and 120 fpm, with a set point of no less than 90 fpm.**

Chemical hood placement design must account for the generally accepted break-in of fan and other hood components to maintain these minimum requirements.

- Variable Air Volume (VAV) hoods must be able to achieve the performance criteria of this section at 18 and 9 inches.

### 13.4.4 Chemical Hood Flow Monitors

- All chemical hoods must have a flow monitor which includes a digital display of the hood flow rate.
- Flow monitors must have a low flow alarm, high flow alarm, sash height alarm, and a mute button.
- Flow monitors must be capable of being field calibrated by E&M. Project managers should consult E&M for any additional specifications or product restrictions.
- **Flow Monitor Alarm Set Points:**
  - Low Flow Alarm: 55 feet per minute.
  - High Flow Alarm: 150 feet per minute.
  - Sash Height Alarm: above 18 inches (i.e., above sash stop height).

### 13.4.5 Chemical Hood Noise Considerations

**The laboratory noise level must meet ANSI Z9.5 standards once built.** Proper acoustic design should be accomplished by providing appropriate fan size and type. Sound attenuators are acceptable, though not preferred.

**A field assessment should be completed to confirm that laboratory noise is within ANSI's NCB noise level recommendations in laboratories where several chemical hoods are installed.**

Chemical hoods will not be approved for service if noise generated by the operation of the hood exceeds the Balanced Noise Criteria from ANSI Z9.5.

## 13.5 SCAVENGER ARMS/SNORKLE HOODS

**Scavenger arms/snorkel hoods are only approved for use with anesthetic gases. Any other proposed uses of these hoods must be discussed with EHS.**

- Scavenger arms will be used in conjunction with the WCM RARC Anesthetic Gases Procedure and must provide sufficient capture of gases. If other uses are intended, ventilation rates made need to be addressed and increased.
- Where installed, scavenger arm air flow controls should be located so that laboratory users cannot adjust the flow (e.g., controls above the ceiling).

## 13.6 BIOLOGICAL SAFETY CABINETS (BSC)

**A hazard assessment must be completed prior to specifying biological safety cabinets for a project. EHS must be involved in this assessment to ensure the cabinets purchased will meet the needs of the users.**

- Natural gas connections and ultraviolet light are not permitted for any biological safety cabinets.
- Biological Safety Cabinet certification according to current NSF/ANSI 49 standards is required for all new BSC's. Consult Section 16.0- Documentation and Regulatory Permitting for additional requirements.

### 13.6.1 Placement

- **BSCs must be located in low traffic areas, away from doors, ventilation diffusers or other air current sources.** Refer to Appendix B-: Biological Safety Cabinet (BSC) Placement Requirements for New Buildings and renovations (NIH Design Requirements Manual, 02/03/2018) for more information.
- Where space permits, a 12-inch (30 centimeters) clearance should be provided behind and on each side of the cabinet.
- A minimum 12-inch (30 centimeters) clearance is required between the exhaust opening on top of the BSC and the ceiling to allow easy access for maintenance and to ensure that the air return to the laboratory is not hindered.
- **Two BSCs should not be installed directly opposite each other when they are closer than six feet apart.**
- Newly installed BSCs must have all of the following:
  - At least 12 inches of clearance above for testing and decontamination of HEPA filters;

- At least 4 inches of clearance from the rear; and
- 6 inches of clearance on the utility side of the cabinet.

- **BSCs must not be located adjacent to chemical hoods; as the flow from these hoods will interfere with the BSC air flow.**

### 13.6.2 Ventilation

**All hard ducted or canopy BSCs connected to the ventilation system must have adequate space so that the configuration of the ductwork will not interfere with air flow.**

- Type A2 cabinets used for work with minute quantities of volatile toxic chemicals and trace amounts of radionuclides must be exhausted through properly functioning exhaust canopies, as provided or approved by the BSC manufacturer.
- Canopy connection exhaust airflow shall be 120 – 125% of the BSC manufacturer's exhaust specifications.
- Types B1 and B2 cabinets are to be vented outside the building without recirculation and have their own dedicated exhaust system.
- The venting system should include a leak-tight duct and a damper in the duct near the cabinet to permit flow adjustment closure and decontamination.
- Where BSCs are connected to external ducts, a flow monitoring system with audible and visual announcements shall be used to alert the BSC user of loss of external ventilation.
- Vented B1 or B2 cabinets must be interlocked with the blower in the duct or building system to prevent pressurization.

### 13.6.3 Approved Equipment

- Baker SterilGARD e3.
- Thermo Scientific 1300 series.
- NUAIRE Labguard ES or series with DC-ECM motor option specified.

## 13.7 REFRIGERATORS

**A flammable-proof refrigerator must be installed if the storage of flammable chemicals is required.** These models should be energy efficient or energy star rated.

**Explosion-proof refrigerators are required for chemical storage rooms.**

## 13.8 AUTOCLAVE ROOMS

**Rooms with autoclave equipment are designated BSL2 spaces.**

Autoclave rooms must have:

- A canopy hood, slotted exhaust, or other suitable means of local exhaust for steam capture.
- 10 air changes (100% outside air) per hour minimum.
- Gasketed or sealed ceiling system for high-humidity.
- Steam and condensate drain as required by autoclave.

Special Requirements: Floor space for carts; adequate space and access for servicing of autoclave mechanical systems.

## 13.9 COLD ROOMS

Cold rooms do not generally have a fresh air supply and are not intended for extended occupancy.

**When designing cold rooms and planning equipment, confirm that the laboratory does not have any plans for extended work inside cold rooms.**

### 13.9.1 Electric

- All electrical outlets in cold rooms must be Grand Fault Circuit Interrupter (GCFI).
- Cold rooms should have external lighting controls.

### 13.9.2 Locks

- All electrical outlets in cold rooms must be Grand Fault Circuit Interrupter (GCFI).
- Cold rooms should have external lighting controls.

## 14.0 Clinical Design Guidelines

The recommendations in this section must be addressed in addition to all applicable general design guidelines in the previous sections for the design of all clinical practice spaces.

**Spaces should be easy to clean and maintain to maintain a sanitary environment.**

Use durable finishes and sterile/antimicrobial surfaces as necessary.

### 14.1 SHARPS CONTAINERS

**EHS must review sharps container layouts in exam rooms prior to finalizing locations, as required by DHHS (NIOSH) Publication Number 97-111, Selecting, Evaluating, and Using Sharps Disposal Containers.**

EHS provides sharps containers for most on-campus clinical locations. Consult EHS for more information on sharps containers.

### 14.2 MEDICAL WASTE AND REDBAG CONTAINERS

**EHS must review and approve all red bag and medical waste containers for clinical spaces since there is a need to comply with strict regulatory requirements.**

Red bags and red bag waste, (i.e., Regulated Medical Waste) must be placed in containers that are closable, durable, and leak-proof with the appropriate biohazardous waste symbol.

### 14.3 EMERGENCY EQUIPMENT

Chemicals used by clinics for disinfection may present hazards to staff. **The planning stages for all clinical spaces should include a review of the disinfection chemicals and processes planned for clinical areas.** This evaluation may present the need for additional emergency equipment, such as a safety shower or eyewash.

All safety showers and eyewashes installed in a clinical environment must meet the minimum design requirements of Section 7.0- Emergency and Safety Equipment Guidelines.

### 14.4 SIGNAGE

Signage requirements beyond the general signage requirements of Section 12.0- Signage will vary depending on the space. Consult EHS for specific signage requirements for all clinical spaces.

## 15.0 Specialty Room Design Guidelines

### 15.1 MEDICAL WASTE STORAGE ROOMS

**When designing medical waste storage areas at WCM, the designer must consider the number of laboratories and/or clinics the facility will serve and allocate an appropriate amount of space.**

Rooms designated for this purpose will not have any other intended use.

### 15.1.1 General Requirements

A medical waste storage room must be designed following these guidelines:

- All necessary materials required to clean and disinfect the area, in case of accidental spillage, must be readily available and accessible.
- Size large to allow clear separation of RMW from any other waste, should it be stored in the same area.
- Protection of stored materials from weather and access by vermin.
- Ability to contain any release or discharge of waste.
- Lockable door (secure location).
- Walls, floors, and ceiling must be cleanable or easily decontaminated.
- Temperature controls to prevent rapid decomposition of waste.
- Mechanical ventilation to prevent the buildup of odors, using refrigeration when necessary.
- A biohazard sign with the universal biohazard symbol and HSDS (see Section 12.0- Signage) must be placed on the door to the room.

## 15.2 CHEMICAL STORAGE ROOMS

**Chemical storage rooms have specific codes and EHS design requirements. Consult EHS in the planning and design guidelines for all chemical storage rooms.**

# 16.0 Documentation and Regulatory Permitting Guidelines

This section aims to clarify known regulatory permitting or documentation issues and requirements.

This section does not represent all permitting or documentation requirements for all projects and construction at WCM. Project Managers are still responsible for meeting all regulatory permitting and documentation requirements for the design and construction of all spaces at WCM.

Some permitting and documentation may need to be completed by contractors. Contractors must retain registered design professionals for all applicable permitting, documentation, and certification.

## 16.1 LABORATORY PERMITTING

Once the laboratory has been occupied, EHS will coordinate a laboratory inspection with the FDNY Laboratory Unit. FDNY permitting will be contingent on meeting the requirements below.

### 16.1.1 Approved Plans

Two copies sized 11” X 17” of the approved (DOB-perforated or bar-coded) drawings must be provided to EHS for FDNY permitting.

The required drawings must include:

- Life safety plan.
- Plan showing the fire rating of the laboratory.
- Mechanical drawings showing any newly installed chemical hoods and a riser diagram showing new hoods.
- Plumbing drawings are required for any new gas manifold installation.

EHS can provide further guidance for required drawings upon request.

## 16.2 AIR PERMITTING

Additional environmental engineering services may be required for all installations that require regulatory air permitting (e.g., boiler, emergency generator).

## 16.3 FUEL OIL STORAGE

Fuel storage requires:

- New York State Department of Environmental Conservation Petroleum Bulk Storage Permit
- Spill Prevention, Control, and Countermeasure (SPCC) Plan

Cornell University's Environmental Compliance Office (Ithaca Campus) must be involved in the design requirements for the fuel system and completing/obtaining these documents. Contact EHS for coordination in completing these requirements.

## 16.4 COMPRESSED GAS (MANIFOLDS)

Cylinder manifold systems must be inspected by the FDNY to ensure that the systems are in safe working order. Depending on the size of the cylinder manifold system, FDNY permits and review by FDNY Technology Management may also be required.

### 16.4.1 Documentation

The following information must be provided to EHS if an FDNY permit is required for cylinder manifolds:

- **Mechanical Ventilation Affidavit:** A letter must be submitted to confirm that the location has constant mechanical exhaust or natural ventilation that is designed to provide a minimum of 1 cubic foot per minute/square foot. The letter must be submitted by a Professional Engineer, Certified Industrial Hygienist, or Registered Architecture on company letterhead and must have signature(s) and official seal.
- **Pressure Test Affidavit:** A notarized test affidavit of the cylinder manifold system conducted by a licensed plumber must be provided. The affidavit needs to show the manifold system has been tested at 1.5 times greater than normal working pressure, but not less than 100 psi for a period of 30 minutes. The plumber who performed the test must sign the affidavit.
- **Technical Documentation:** Manufacturer's technical data/design specification of the cylinder manifold header must be provided.

### 16.4.2 FDNY Technology Management Approval

Liquid or high volume compressed and oxidizing gas systems may require a plan review by FDNY's Technology Management Unit. EHS can assist in determining if this review will be required for gas systems. This determination should be conducted early in the design phase to ensure the system is approved prior to users needing the system.

## 16.5 BIOLOGICAL SAFETY CABINETS (BSC)

**The operational integrity of a BSC must be validated before it is placed into service.** On-site testing that follows the recommendations for field testing (NSF/ANSI 49 - 2002 Annex F plus Addendum #1, or newer version) must be performed by accredited and EHS-approved field certifiers. Copies of certifications must be provided to EHS upon test completion.

## 16.6 CHEMICAL HOODS

**All chemical hood models must pass the ASHRAE 110 (latest edition) "As Manufactured" test.** Newly installed chemical hoods must pass the ASHRAE 110 test (latest edition) "as installed" by a third-party vendor. Chemical hoods will not be approved for use until this requirement is met. Documentation of this test must be provided to EHS upon certification.

## 17.0 Program Revisions

This program will be reviewed annually and in conjunction with significant NYC code revisions.

Updates to this program will be made accordingly.

## 18.0 Definitions

- **Combination shower/eyewash unit:** the combination of a shower with eyewash or with a drench hose; or with both into one assembly.
- **Eyewash:** a device used to irrigate and flush both the face and the eyes.
- **Ground Fault Circuit Interrupter:** an electrical wiring device that disconnects a circuit whenever it detects that the electric current is not balanced between the energized conductor and the return neutral conductor.
- **Hand-held drench hose:** a flexible hose connected to a water supply and used to irrigate and flush eyes, face, and body areas. Use of this unit may require that another person hold the hose to allow the victim to hold his or her eyes open.
- **Laboratory unit:** an enclosed fire-rated space used for testing, research, experimental or educational purposes. Laboratory units may or may not include offices, lavatories, and other contiguous rooms maintained for or used by laboratory personnel, as well as corridors within the units. They may also contain one or more separate laboratory work areas.
- **Material Safety Data Sheets:** a form with data regarding the safe use and handling of a particular substance.
- **Safety shower:** a unit that enables a user to cascade water over the entire body. This unit is used for general irrigation of the body, and although it can be used to rinse the face, the unit is not meant for flushing of the eyes.

**Storage room:** a room where chemicals or gases regulated by RCNY Title 3 Chapter 10 are stored and not otherwise used or reacted.

## 19.0 References

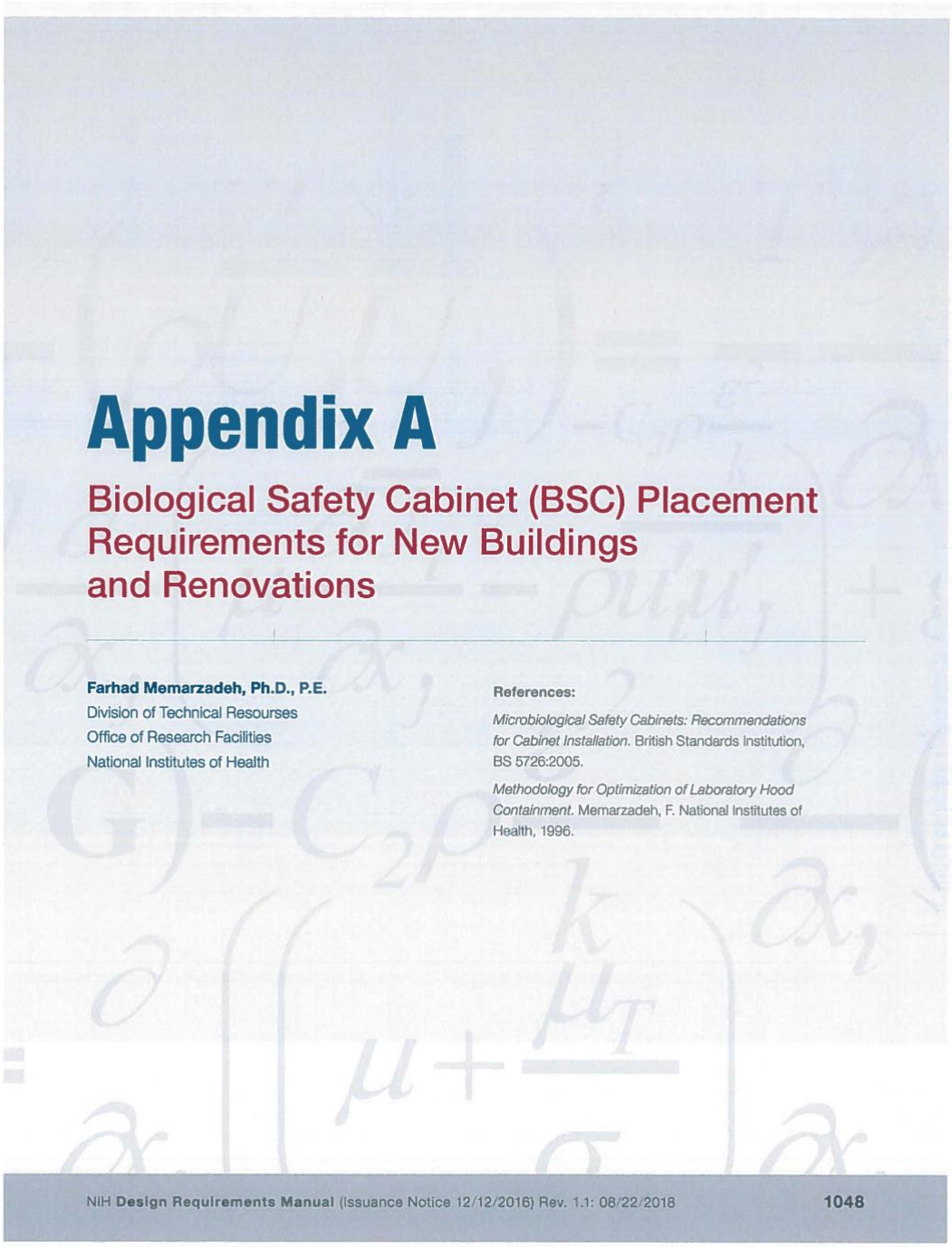
- NYC Construction Codes – 2014 Edition
- NYC Building Code – 1968 Edition
- NYC Fire Code - 2014 Edition
- 3 RCNY Rules of the Fire Department of NYC
- OSHA 1910 Subpart D – Walking-Working Surfaces
- OSHA 1910 Subpart O – Machinery and Machine Guarding
- NFPA – 30 Flammable and Combustible Liquid Code
- NFPA – 45 Standard on Fire Protection for Laboratories Using Chemicals
- NFPA – 101 Life Safety Code
- NFPA – 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
- ANSI 358.1 – Standards for Emergency Eyewash and Shower Equipment
- ANSI 14.3 – Standards for Ladders – Fixed – Safety requirements
- ANSI 1264.1 – Safety Requirements for Workplace Walking/Working Surfaces
- ANSI/AIHA Z-9.5 – Standard for Laboratory Ventilation
- ANSI/ASHRAE 110 – Method of Testing Performance of Laboratory Fume Hoods
- NSF/ANSI 49 – Standard for the Evaluation of Class II Biological Safety Cabinets
- Title 15 of Article 27 of the Environmental Conservation Law: https://www.dec.ny.gov/regulations/8752.html
- 6 NYCRR Subparts 360-10 and 360-17, and Part 364 regulations
- 6 NYCRR Part 365 Regulated Medical Waste and Other Infectious Wastes
- Public Health Law 1389 AA-GG

- 10 NYCRR Part 70 govern the activities of the New York State regulated community to properly manage RMW
- Facility Guidelines Institute Guidelines for Design and Construction of Outpatient Facilities, Edition: 2018
- UL Standard 217, 9th Edition- Standard for Smoke Alarms
- UL Standard 268, 7th Edition- Smoke Detectors for Fire Alarm Systems
- U.S. DHHS, PHS, Centers for Disease Control and Prevention, National Institutes of Health, Biosafety in Microbiological and Biomedical Laboratories

## Appendix A – Approved Equipment

| Equipment Type | Manufacturer | Model | Additional Information |
|---|---|---|---|
| **Emergency Equipment** | | | |
| Spill Kit | Brady | Hazwik Portable Economy Spill Kit | |
| Eyewash – Sink Mounted | Watersaver | EW1022 | |
| Eyewash/ Safety Shower – Recessed Combo Unit | Watersaver | SSBF2150 | Daylight drain is not permitted. |
| Eyewash/ Safety Shower – Combo Unit | Watersaver | SS902 | |
| Safety Shower | Watersaver | ES658 | Semi-recessed unit |
| **Fire Alarm** | | | |
| Fire Alarm Control Panel | Edwards | EST3 | |
| Fire Alarm Procedure Box | Safety Media Inc. | Fire Safety Plan Box Stainless: AA65SS White: AA65 | |
| Fire Alarm Printer | Keltron | Series 90 | |
| Duct Detector | SIGA | DH Type Duct Detector | |
| **Laboratory Equipment** | | | |
| B2 Cabinet | Baker | SterilGARD e3 | |
| B2 Cabinet | Thermo-scientific | 1300 | |
| B2 Cabinet | NUAIRE | Labguard ES | Or series with DC-ECM motor. |
| Oxygen Sensor | PureAire | Aircheck O2 | |

## Appendix B – Biological Safety Cabinet (BSC) Placement Requirements for New Buildings and renovations (NIH Design Requirements Manual, 02/03/2018)



# Appendix A

## Biological Safety Cabinet (BSC) Placement Requirements for New Buildings and Renovations

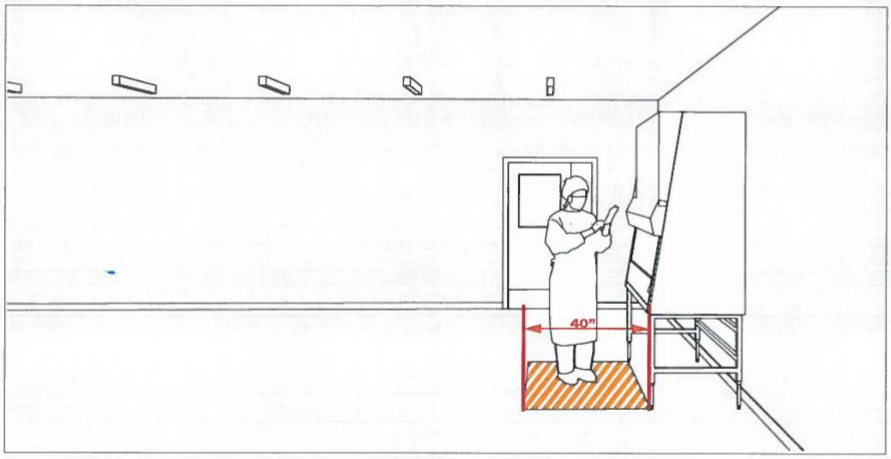
**Farhad Memarzadeh, Ph.D., P.E.**
Division of Technical Resourses
Office of Research Facilities
National Institutes of Health

**References:**

*Microbiological Safety Cabinets: Recommendations for Cabinet Installation*. British Standards Institution, BS 5726:2005.

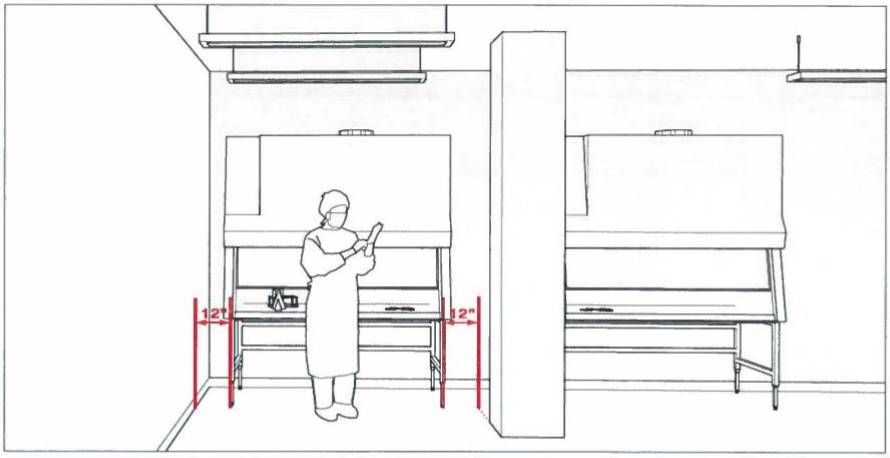
*Methodology for Optimization of Laboratory Hood Containment*. Memarzadeh, F. National Institutes of Health, 1996.

**BSC Workspace:**



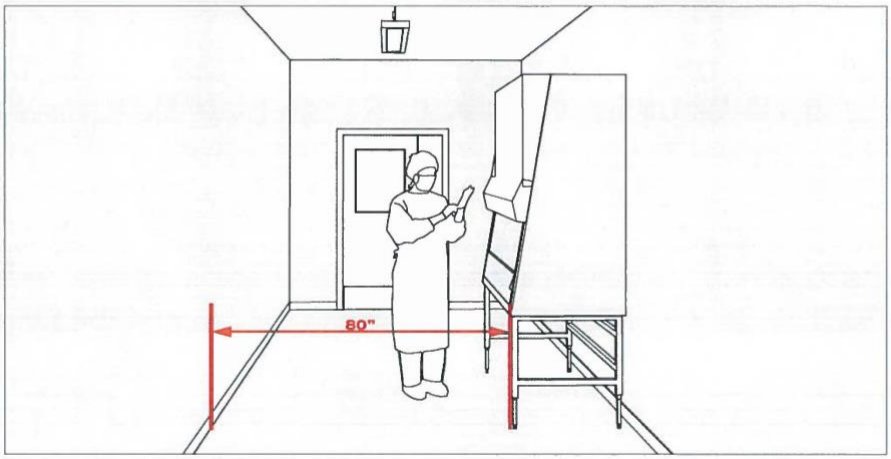

Maintain an undisturbed space of 40" around the BSC.

**Distance to Adjacent Walls & Columns:**



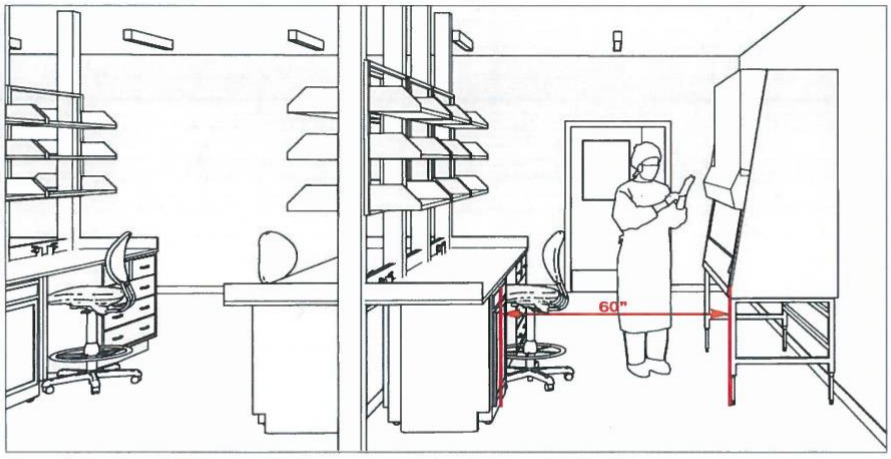

Maintain a distance of 12" to adjacent walls & columns. Note: columns can aid in defining traffic routes.

**Distance to Opposing Walls:**



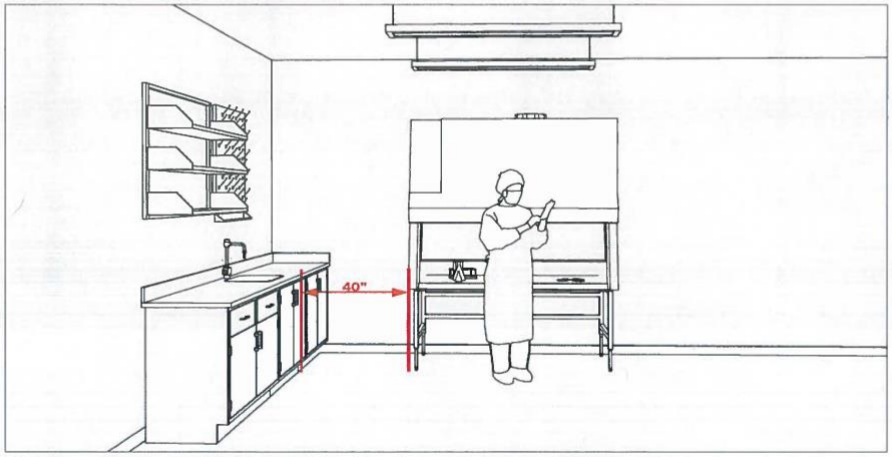

Place BSCs at least 80" from opposing walls.

**Distance to Opposing Bench Tops:**



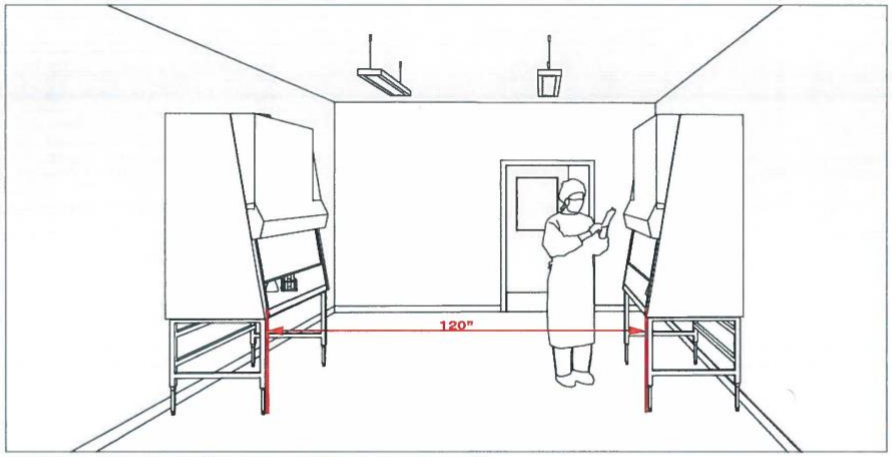

Place BSCs at least 60" to opposing bench tops or areas with occasional traffic.

**Distance to Adjacent Bench Tops:**



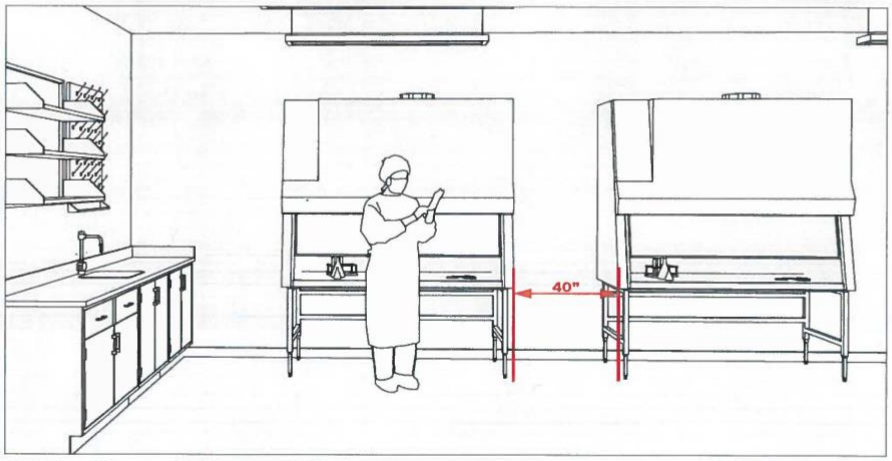

Maintain a distance of 40" between BSC and bench tops along a perpendicular wall.

**BSC Placement Along Opposing Walls:**



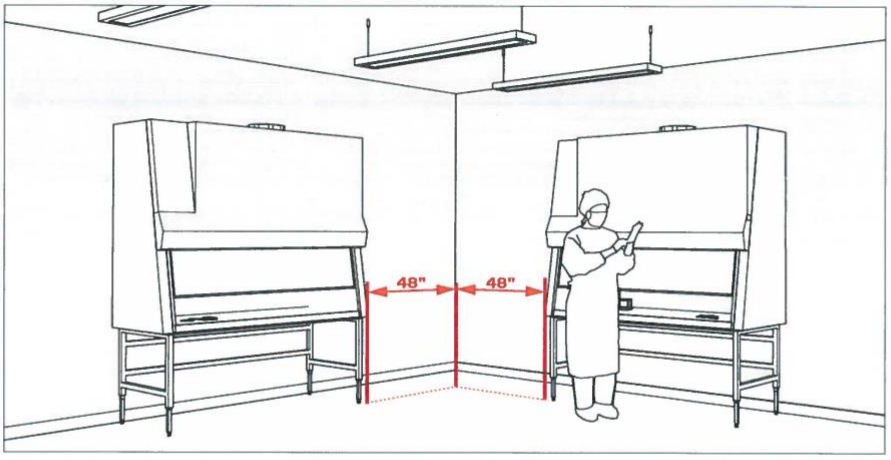

Maintain a distance of 120" between BSCs on opposing walls.

**BSC Placement Along the Same Wall:**



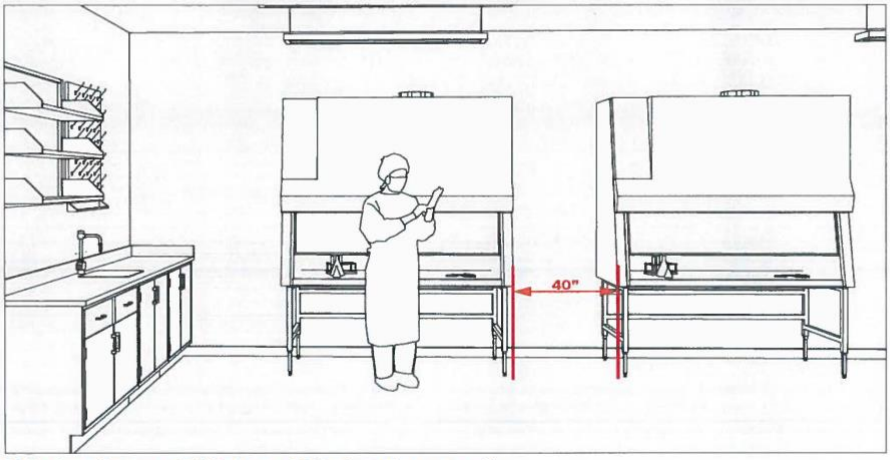

Maintain a distance of 40" between BSCs along the same wall.

**BSC Placement Along Perpendicular Walls:**



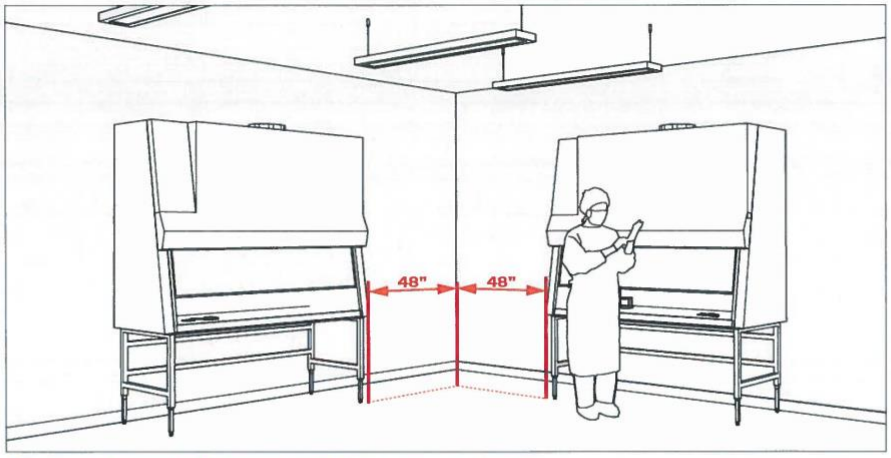

Maintain a distance of 48" between BSCs along perpendicular walls.

**BSC Placement Along the Same Wall:**




Maintain a distance of 40" between BSCs along the same wall.

**BSC Placement Along Perpendicular Walls:**




Maintain a distance of 48" between BSCs along perpendicular walls.