

SECTION 11 53 53 – BIOLOGICAL SAFETY CABINETS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Standards: Except where modified or exceeded by the requirements of this Specification, conform to the following standards:
 - 1. Biological Safety Cabinets:
 - a. Scientific Equipment and Furniture Association Standards
 - b. ANSI/AIHA Z9.5 – Laboratory Ventilation Standards
 - 2. Service Fittings: Scientific Apparatus Makers Association Standard for Laboratory and Hospital Service Fittings.
- B. Testing – Biological Safety Cabinets: Before shipping, each unit shall be tested to meet requirements of N.S.F. Standard #49 for periodic certification. Submit one copy of test with each unit.
- C. Testing – Biological Safety Cabinets: Submit a certified copy of the Personnel, Product and Cross-Contamination (Biological) Tests, N.S.F. Standard #49 performed on one (1) unit from each production run from which cabinets have been purchased. Owner representative may witness test.
- D. Certification – Biological Safety Cabinets: Manufacturer will arrange for certification of cabinets after installation in accordance with N.S.F. Standard #49.
 - 1. Division of Research Safety, Biological Safety Section will approve certification firm.

1.2 SUBMITTALS

- A. Record Documents:
 - 1. Shop Drawings: Fabrication and Installation: Show fabrication and installation details and dimensions for biological safety cabinets and other items in this section. Show location and details of field joints between units and in tops. Show fastening types and locations for securing units in place. If they are required, show location, size and details of fillers.
 - 2. Shop Drawings – Rough-In: Show location and requirements for utility and service connections to this Work.
 - 3. Certified room balance report.
 - 4. Certification of biological safety cabinets.

PART 2 - PRODUCTS

2.1 SERVICE FITTINGS

- A. Finish: Polished chrome on brass body unless specified otherwise.
- B. Equip valve handles with color coded plastic index buttons as follows:

Service	Indexing	Button Color	Lettering Color
Cold Water	CW	Green	White
Hot Water	HW	Red	White
Air	AIR	Blue	White
Gas	GAS	Orange	White
Vacuum	VAC	Yellow	White
Distilled Water	DW	White	Black
Steam	Steam	Black	White
Oxygen	OXY	Lt. Green	White
Nitrogen	N2	Gray or Brown	Black or White

2.2 BIOLOGICAL SAFETY CABINET – CLASS II, TYPE A

- A. Units shall meet or exceed requirements of NCI Specification “General Purpose Clean Air Biological Safety Cabinet” (Class II, Type A) and NSF Standard #49.
- B. Units shall be tested and certified as required in the paragraph entitled *Quality Assurance* in this Section.
- C. Units to be console type, nominal 4 foot or 6 foot wide as indicated. Unit shall be transportable through a 3'-0" x 6'-8" doorway. Unit and ergonomic stand must be able to be moved easily as one unit with roller lift. Unit shall be installed as a Type A Cabinet.
- D. Units shall be UL listed.
- E. Exterior material: Sealed panels of 16 gage cold rolled steel and dress panels of 18 gage Cold rolled steel. Painted Perma-white.
- F. Interior material: 16 gage Type 304 stainless steel with No. 4 finish. Interior corners shall be radiused (7/16 inch). Work surface to be recessed with radiused corners.
- G. Unit legs: Adjustable.
- H. Sliding View-screen: Slanted with 10 degree angle from the vertical, ¼ inch safety or tempered glass capable of moving to a fully closed position during shutdown periods.
- I. Air intake velocity through 8 inch front access: 100 fpm minimum.
- J. Unit shall be designed to recirculate 70 percent of the air volume and to exhaust 30 percent to the room.
- K. Units shall have standard supply and exhaust HEPA filters, 99.99 percent efficient for 0.3 microns per DOP test. The HEPA filters shall be low resistance type achieving a low static pressure of 0.30 to 0.45 inches water column. Provide one extra set of filters for each cabinet. Filter frames shall be constructed of wood.
- L. Filters shall be front loading.
- M. Stainless steel air diffuser and filter protector provided in work area.
- N. Control valve or damper to maintain supply and exhaust air balance and shut-off for decontamination.

- O. Unit to have fluorescent fixture mounted outside cabinet providing more than 100 footcandle lighting.
- P. Electrical power receptacles: Provide following unless indicated otherwise on Drawings; GFI type, on separate circuit from fan motor and lights, located in drip-proof, gas-tight box inside cabinet. For 6 foot units, provide two (2) duplex receptacles. For 4 foot units, provide one (1) duplex receptacle. Stainless steel cover plates.
- Q. Air and vacuum on right and left side.
- R. Spill trough drain valve: Stainless steel ball valve.
- S. Locate service fittings 6 inch minimum beyond cabinet face. All cabinets are to be prepiped with no pipe less than or equal to ½ inch diameter in size. Make service connections to the cabinet through the top and toward the back of the cabinet. Connections through the back or sides of the cabinet are not acceptable. Connections shall extend 2 inches above the cabinet. Provide schedule 40 black iron pipe for gas piping. Provide type K copper silver solder (15 percent solder) piping for vacuum and air lines. Flexible connectors on gas piping are not acceptable. Install all hard pipe. Use all domestic materials.
- T. Exhaust Air Flow
 - 1. 4 foot 8 inch opening 269 CFM
 - 2. 4 foot 10 inch opening 355 CFM
 - 3. 6 foot 8 inch opening 408 CFM
 - 4. 6 foot 10 inch opening 510 CFM
- U. Unit shall have an audible alarm and a flashing LED to indicate when the sliding view screen is in an unsafe position. Provide mute alarm switch.

2.3 BIOLOGICAL SAFETY CABINET – CLASS II, TYPE B1

- A. Units shall meet or exceed requirements of NCI Specification “General Purpose Clean Air Biological Safety Cabinet” (Class II, Type B Safety Cabinet) and NSF Standard #49.
- B. Units shall be tested and certified as required in the paragraph entitled *Quality Assurance* in this Section.
- C. Units to be console type, nominal 4 foot or 6 foot wide as indicated. Unit shall be transportable through a 3'-0" x 6'-8" doorway.
- D. Units shall be UL listed.
- E. Exterior material: 14 gage cold rolled steel with white baked enamel finish.
- F. Interior material: Type 304 stainless steel with No. 4 finish. Interior corners shall be radiused. Work surface to be recessed with radiused corners.
- G. Unit legs: Adjustable.
- H. View-screen: Vertical sliding, counterweighted, ¼ inch safety or tempered glass.
- I. Air intake velocity through 8 inch front access: 100 fpm minimum.

- J. Unit shall be designed to directly exhaust 70 percent (through a HEPA filter) of the total volume of air handled in the unit from the work surface area to an outside exhaust provided by others. 30 percent recirculation within cabinet.
- K. Units shall have zero-probed supply and exhaust HEPA filters, 99.99 percent efficient for 0.3 microns per DOP test. The HEPA filters shall be low resistance type achieving a low static pressure of 0.30 to 0.45 inches water column. Provide one extra set of filters for each cabinet. Filter frames shall be constructed of wood.
- L. Filters shall be front loading.
- M. Protect supply filter with metal diffuser.
- N. Air-tight control valve or damper to maintain supply and exhaust air balance and shut-off for decontamination.
- O. Unit to have fluorescent fixture mounted outside cabinet.
- P. Electrical power receptacles: Provide following unless indicated otherwise on Drawings; GFI type on separate circuit from fan motor and lights, located in drip-proof, gas-tight box. For 6 foot units, provide two (2) duplex receptacles. For 4 foot units, provide one (1) duplex receptacle. Stainless steel cover plates.
- Q. Gas/vacuum service fittings: Two (2) valves each side wall, unless indicated otherwise on Drawings.
- R. Spill through drain valve: Stainless steel ball valve.
- S. Locate service fittings 6 inch minimum beyond cabinet face. All cabinets are to be prepiped with no pipe less than or equal to ½ inch diameter in size. Make service connections to the cabinet through the top and toward the back of the cabinet. Connections through the back or sides of the cabinet are not acceptable. Connections shall extend 2 inches above the cabinet. Provide schedule 40 black iron pipe for gas piping. Provide type K copper silver solder (15 percent solder) piping for vacuum and air lines. Flexible connectors on gas piping are not acceptable. Install all hard pipe. Use all domestic materials.
- T. Unit shall have an audible and visible alarm to indicate low exhaust air flow by monitoring air mass. Audible and visible alarm when sliding viewscreen is in an unsafe position.

2.4 BIOLOGICAL SAFETY CABINET – CLASS II, TYPE B2

- A. Units shall meet or exceed requirements of NSF Standard #49.
- B. Units shall be tested and certified as required in the parag, Quality Assurance.
- C. Units to be console type, nominal 4 foot or 6 foot wide as indicated. Unit shall be transportable through a 3'-0" x 6'-8" doorway.
- D. Unit shall be UL listed.
- E. Exterior material: Cold rolled steel with white baked enamel finish.
- F. Interior material: Type 304 stainless steel with No. 4 finish. All stainless steel to be welded construction with radiused corners.

- G. Unit legs: Adjustable.
- H. View-screen: Vertical sliding, slanted 10 degree, counter-weighted, ¼ inch safety glass – opens to 8-¼ inch.
- I. Air intake velocity through 8 inch or 10 inch front access: 105 fpm minimum.
- J. Unit shall be designed to directly exhaust 100 percent of the total volume of air handled in the unit from the work surface area to an outside exhaust provided by others.
- K. Units shall have zero-probed supply and exhaust HEPA filters, 99.99 percent efficient for 0.3 microns per DOP test. The HEPA filters shall be low resistance type achieving a low static pressure of 0.30 to 0.45 inches water column. Provide one extra set of filters for each cabinet. Filter frames shall be constructed of wood.
- L. Filters shall be front loading.
- M. Units shall feature a bag-in/bag-out procedure for replacement of exhaust filter.
- N. Protect supply filter with metal diffuser.
- O. Air-tight control valve or damper to maintain supply and exhaust air balance and shut-off for decontamination.
- P. Unit to have fluorescent fixture mounted outside cabinet.
- Q. All electrical components shall be outside Work zone and exhaust flow ducting.
- R. Electrical power receptacles: Provide following unless indicated otherwise on Drawings: GFI type, on separate circuit from fan motor and lights. Provide two (2) duplex receptacles. Stainless steel cover plates.
- S. Air/Gas/Vacuum service fittings: Two (2) remote control valves.
- T. Spill trough drain valve: Stainless steel ball valve.
- U. Locate service fittings 6 inch minimum beyond cabinet face. All cabinets are to be prepped with no pipe less than or equal to ½ inch diameter in size. Make service connections to the cabinet through the top and toward the back of the cabinet. Connections through the back or sides of the cabinet are not acceptable. Connections shall extend 2 inches above the cabinet. Provide schedule 40 black iron pipe for gas piping. Provide type K silver solder (15 percent solder) piping for vacuum and air lines. Flexible connectors on gas piping are not acceptable. Install all hard pipe. Use all domestic materials.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate installation and service requirements with other trades.

3.2 CASEWORK INSTALLATION

- A. Install this Work under direction of manufacturer.

- B. Floor supported Work: Set in position, level and fasten to adjacent units as required. Fasten counter tops to base cabinets. Seal tops and splashes to abutting vertical surfaces. Install filler panels between cabinets and walls.
- C. Wall mounted Work: Fasten in place to bracing provided in wall system.

3.3 BIOLOGICAL SAFETY CABINET INSTALLATION

- A. Install new fan and electrical disconnect on equipment supports per Division 07. Install motor starter for $\frac{3}{4}$ horsepower and larger motors in a protected location near fan. Coordinate with Owner's Representative.
- B. Install new stack per attached detail. Provide guy wire to support stack as required. Coordinate location of guy wire with Owner's Representative.
- C. Paint and identify fan housing.
- D. Provide reinforced neoprene connector between fan and ductwork.
- E. Provide stainless steel transition section between hood or safety cabinet and ductwork.
- F. Install volume control damper in ductwork directly above hood and transition section.
- G. Install new base cabinet under existing hood and install concealed vent(s) to exhaust duct above hood as required.
- H. Connect electrical and mechanical services to devices furnished with hood or safety cabinet.

3.4 CLEANING

- A. Remove debris from area of installation daily and at completion of Project.

END OF SECTION **11** 53 53

This section of the *U of I Facilities Standards* establishes minimum requirements only.
It should not be used as a complete specification.