# SECTION 11610 - LABORATORY FUME HOODS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Bench-top laboratory fume hoods.
2. Piping and wiring within fume hoods for service fittings, light fixtures, fan switches, and other electrical devices included with fume hoods.
3. Fume hood base cabinets.
4. Laboratory sinks and cup sinks in fume hoods.
5. Water, laboratory gas, and electrical service fittings in fume hoods.

B. Related Requirements:

1. Section 06105 "Miscellaneous Carpentry" for wood blocking for anchoring fume hoods.
2. Section 09111 "Non-Load-Bearing Steel Framing" for reinforcements in metal-framed partitions for anchoring fume hoods.
3. Section 09653 "Resilient Wall Base and Accessories" for resilient base applied to fume hood base cabinets.
4. Mechanical drawings for VAV controls for fume hood exhaust.
5. Mechanical drawings for field quality-control testing of fume hoods.
6. Drawing CLH-001 for additional requirements.

### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

### 1.4 COORDINATION

A. Coordinate layout and installation of framing and reinforcements for lateral support of fume hoods.

B. Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.

## 1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For laboratory fume hoods.

1. Include plans, elevations, sections, and attachment details.
2. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports.
3. Indicate locations and types of service fittings together with associated service supply connection required.
4. Indicate duct connections, electrical connections, and locations of access panels.
5. Include roughing-in information for mechanical, plumbing, and electrical connections.
6. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from the above items.
7. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
8. Include coordinated dimensions for laboratory equipment specified in other Sections.

C. Samples: For fume hood exterior finishes, interior lining, epoxy sinks, epoxy work tops and phenolic-composite work tops.

## 1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Showing compliance with specified performance requirements for as-manufactured containment and static pressure loss, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency.

B. Source quality-control reports.

C. Field quality-control reports.

## 1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.

## 1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

## 1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining

temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Locate concealed framing, blocking, and reinforcements that support fume hoods by field measurements before being enclosed, and indicate measurements on Shop Drawings.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Bypass Fume Hoods with Steel Exterior:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Protector XStream fume hood by Labconco Corporation or comparable product by one of the following:

      a. Kewaunee Scientific Corporation.
      b. Thermo Fisher Scientific, Inc.

B. Bypass Fume Hoods with Steel Exterior:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Protector ClassMate fume hood by Labconco Corporation or comparable product by one of the following:

      a. Kewaunee Scientific Corporation.
      b. Thermo Fisher Scientific, Inc.

C. Source Limitations: Obtain laboratory fume hoods from single manufacturer.

   1. Obtain laboratory fume hoods from same source as laboratory casework.

D. Product Designations: Drawings indicate sizes, types, and configurations of fume hoods by referencing designated manufacturer's catalog numbers. Other manufacturers' fume hoods of similar sizes, types, and configurations, and complying with the Specifications, may be considered. See Section 01600 "Product Requirements."

### 2.2 PERFORMANCE REQUIREMENTS

A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110:

   1. As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
   2. Average Face Velocity: 100 fpm plus or minus 10 percent with sashes fully open.
   3. Face-Velocity Variation: Not more than 25 percent of average face velocity across the face opening with sashes fully open.
   4. Sash Position: Fully open.

a. Test hoods with horizontal sashes with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
b. Test hoods with combination sashes fully raised, with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.

5. Release Rate: 4.0 L/min.
6. Test Setup Modifications: Conduct tests with a minimum of three and a maximum of five people in the test room and with two 1-gal. round paint cans, one 12-by-12-by-12-inch cardboard box, and three 6-by-6-by-12-inch cardboard boxes in the fume hood during the test. Position items from 6 to 10 inches behind the sash, randomly distributed, and supported off the work surface by 2-by-2-inch blocks.
7. Walk-by Test: At the conclusion of containment test, execute three rapid walk-bys at 30-second intervals, 12 inches behind the mannequin. Test-gas concentration during each walk-by shall not exceed 0.1 ppm and shall return to specified containment value within 15 seconds.

B. Static-Pressure Loss: Not more than 1/2-inch wg at 100-fpm face velocity with sash fully open when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

## 2.3 FUME HOODS

A. Product Standards: Comply with SEFA 1, "Laboratory Fume Hoods - Recommended Practices." Provide fume hoods UL listed and labeled for compliance with UL 1805.

B. Bypass Fume Hoods: Provide bypass fume hoods. Compensating bypass above the sash opens as sash is closed. Provide sufficient bypass capacity so that face velocity with sash opening of 6 inches does not exceed 3 times the face velocity with sash fully open.

## 2.4 MATERIALS

A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.

B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.

1. For perchloric acid fume hoods, use Type 316L instead of Type 304.

C. Glass-Fiber-Reinforced Polyester: Polyester laminate with a chemical-resistant gel coat on exposed faces, and having a flame-spread index of 25 or less according to ASTM E 84.

D. Epoxy: Factory molded, modified epoxy-resin formulation with smooth, nonspecular finish.

1. Physical Properties:

a. Flexural Strength: Not less than 10,000 psi.

b. Modulus of Elasticity: Not less than 2,000,000 psi.
c. Hardness (Rockwell M): Not less than 100.
d. Water Absorption (24 Hours): Not more than 0.02 percent.
e. Heat Distortion Point: Not less than 260 deg F.
f. Flame-Spread Index: 25 or less according to ASTM E 84.

2. Chemical Resistance: As follows when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:

a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).

3. Color: As selected by Architect from manufacturer's full range.

E. Polypropylene: Unreinforced polypropylene complying with ASTM D 4101, Group 01, Class 1, Grade 2.

F. Glass: Clear, laminated tempered glass complying with ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality-Q3; with two plies not less than 3.0 mm thick and with clear, polyvinyl butyral interlayer.

1. Safety Glass: Provide products complying with testing requirements in 16 CFR 1201 for Category II materials.
2. Permanently mark safety glass with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

H. Fasteners: Provide stainless-steel fasteners where exposed to fumes.

## 2.5 FABRICATION

A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of being partly disassembled as necessary to permit movement through a 35-by-79-inch door opening.

B. Steel Exterior: Fabricate from steel sheet, 0.048 inch thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.

C. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of

fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.

D. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.

E. Interior Lining: Provide one of the following unless otherwise indicated:

1. Glass-fiber-reinforced polyester, not less than 3/16 inch thick.
2. Glass-fiber-reinforced epoxy, not less than 3/16 inch thick.
3. Phenolic composite, not less than 1/4 inch thick.

F. Lining Assembly: Unless otherwise indicated, assemble with stainless-steel fasteners or epoxy adhesive, concealed where possible. Seal joints by filling with chemical-resistant sealant during assembly.

1. Fasten lining components to a rigid frame assembly fabricated from stainless steel and to which exterior panels are attached.
2. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.

G. Molded Glass-Fiber-Reinforced Polyester Lining: Molded unit consisting of end panels, back panel, preset rear baffle, and top bonded together into a single piece; reinforced to form a rigid assembly to which exterior is attached.

1. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.

H. Rear Baffle: Unless otherwise indicated, provide baffle, of same material as fume hood lining, at rear of hood with openings at top and bottom. Secure baffle to cleats at rear of hood with stainless-steel screws. Fabricate baffle for easy removal for cleaning behind baffle.

1. Provide preset baffles.
2. Provide epoxy-coated, stainless-steel screen at bottom baffle opening to prevent paper from being drawn into the exhaust plenum behind baffles.

I. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.

1. Duct-Stub Material: stainless steel.

J. Bypass Grilles: Provide grilles at bypass openings of fume hoods.

K. Sashes: Provide operable sashes of type indicated.

1. Fabricate from 0.048-inch-thick steel sheet or aluminum, with chemical-resistant finish. Form into four-sided frame with bottom corners welded and finished smooth. Make top member removable for glazing replacement. Set glazing in chemical-resistant, U-shaped gaskets.
2. Glaze with laminated safety glass.

3. Counterbalance vertical-sliding sash with sash weight and stainless-steel cable system to hold sash in place regardless of position. Provide ball-bearing sheaves, plastic glides in stainless-steel guides, and stainless-steel lift handles. Provide rubber bumpers at top and bottom of each sash unit.

L. Airfoil: Unless otherwise indicated, provide airfoil at bottom of fume hood face opening with 1-inch space between airfoil and work top. Sash closes on top of airfoil, leaving 1-inch opening for air intake. Airfoil directs airflow across work top to remove heavier-than-air gases and to prevent reverse airflow.

1. Fabricate airfoil from stainless steel coated with polytetrafluoroethylene or polyvinylidene fluoride.

M. Light Fixtures: Provide vaporproof, two-tube, rapid-start, fluorescent light fixtures, of longest practicable length; complete with tubes at each fume hood. Shield tubes from hood interior with 1/4-inch-thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Provide units with fluorescent tubes easily replaceable from outside of fume hood.

1. Provide fluorescent tubes with color temperature of 3500 K and minimum color-rendering index of 85.

N. Filler Strips: Provide as needed to close spaces between fume hoods or fume hood base cabinets and adjacent building construction. Fabricate from same material and with same finish as fume hoods or fume hood base cabinets, as applicable.

O. Ceiling Extensions: Provide filler panels matching fume hood exterior to enclose space above fume hoods at front and sides of fume hoods and extending from tops of fume hoods to ceiling.

P. Finished Back Panels: Where rear surfaces of fume hoods are exposed to view, provide finished back panels matching rest of fume hood enclosure.

Q. Comply with requirements in other Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings. Securely anchor fittings, piping, and conduit to fume hoods unless otherwise indicated.

## 2.6 FUME HOOD BASE CABINETS, WORK TOPS, SINKS AND SERVICE FITTINGS

A. Provide metal base cabinets in finish matching fume hood exterior finish.

B. Work Tops: Solid modified epoxy resin.

1. Work-Top Configuration: Raised (marine) edge with rounded edge and corners.

C. Cup Sinks: Polypropylene, 3-by-6-inch oval.

1. Provide polypropylene cup sinks with polypropylene strainers and integral tailpieces.

## 2.7 CHEMICAL-RESISTANT FINISH

A. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.

B. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8M. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

## 2.8 ACCESSORIES

A. Airflow Indicator and Alarm: Provide each fume hood with manufacturer's standard airflow indicator with audible and visual alarm that activates when airflow sensor reading is outside of preset range.

B. Sash Alarm: Provide fume hoods with audible and visual alarm that activates when sash is opened beyond preset position.

1. Provide with silence and test switches.

C. Sash Stops: Provide fume hoods with sash stops to limit hood opening to 50 percent of sash height. Sash stops can be manually released to open sash fully for cleaning fume hood and for placing large apparatus within fume hood.

D. Bypass Grille Blank-off Panel: Provide fume hoods with blank-off panel on bypass grille designed for use with sash stops to reduce exhaust air volume and provide design face velocity with sash at 50 percent open position.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

A. General: Install fume hoods according to manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Comply with requirements in Section 12363 "Wood Laboratory Casework" for installing fume hood base cabinets, work tops, and sinks.

C. Comply with requirements for installing water and laboratory gas service fittings and electrical devices.

1. Install fittings according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions. Set bases and flanges of sink and work top-mounted fittings in sealant recommended by manufacturer of sink or work-top material. Securely anchor fittings to fume hoods unless otherwise indicated.

## 3.3 FIELD QUALITY CONTROL

A. Field test installed fume hoods according to "Flow Visualization and Velocity Procedure" requirements in ASHRAE 110.

1. Test one installed fume hood, selected by Architect, for each type of hood installed, according to ASHRAE 110 If tested hood fails to meet performance requirements, field test additional hoods as directed by Architect.

B. Field test installed fume hoods according to ASHRAE 110 to verify compliance with performance requirements.

1. Adjust fume hoods, hood exhaust fans, and building's HVAC system, or replace hoods and make other corrections until tested hoods perform as specified.
2. After making corrections, retest fume hoods that failed to perform as specified.

## 3.4 ADJUSTING AND CLEANING

A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.

B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

## 3.5 FUME HOOD SCHEDULE

A. Bench-Top Fume Hood Type H001 – General Chemistry & Research Laboratory – Standard (Basis-of-Design Product: Protector XStream 1105-10002 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

    a. Operation: Vertical-sliding, single-hung sash.
    b. Operation: Two horizontal-sliding, bypassing sashes.
    c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 9503520 by Labconco).

6. Storage Cabinets: Two (2) 30-inch wide, dual door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9900200 by Labconco).

7. Airflow Monitor: Basis-of-Design Product: 9413400 Guardian Digital Airflow Monitor Kit by Labconco).
8. Cup Sink: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

    a. Water: One remote-control, rigid, gooseneck, single-service faucet with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 4005900 by Labconco).
    b. Laboratory Gas for Air: One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
    c. Laboratory Gas for Gas (Fuel Gas): One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
    d. Electrical: One 220 V receptacle at one end of hood, mounted on exterior front face of end pilaster.
    e. Electrical: Three 110V duplex receptacles at both end(s) of hood, mounted on exterior front face of end pilaster.

        1) Provide GFCI receptacles.

B. Bench-Top Fume Hood Type H002 – General Chemistry & Research Laboratory – Accessible (Basis-of-Design Product: Protector XStream 1105-10002 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

    a. Operation: Vertical-sliding, single-hung sash.
    b. Operation: Two horizontal-sliding, bypassing sashes.
    c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 9503520 by Labconco).

6. Storage Cabinets: Three (3) accessible 12-inch wide, single left hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904500 by Labconco) and Two (2) accessible 12-inch wide, single right hinge door,

powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904200 by Labconco) per hood.

7. Airflow Monitor: Basis-of-Design Product: 9413400 Guardian Digital Airflow Monitor Kit by Labconco).
8. Cup Sinks: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

    a. Water: One remote-control, rigid, gooseneck, single-service faucet with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 4005900 by Labconco).
    b. Laboratory Gas for Air: One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
    c. Laboratory Gas for Gas (Fuel Gas): One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
    d. Electrical: One 220 V receptacle at one end of hood, mounted on exterior front face of end pilaster.
    e. Electrical: Three 110V duplex receptacles at both ends of hood, mounted on exterior front face of end pilaster.

        1) Provide GFCI receptacles.

C. Bench-Top Fume Hood Type H003 – Organic Chemistry Laboratory – Standard (Basis-of-Design Product: Protector ClassMate 69711601 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

    a. Operation: Vertical-sliding, single-hung sash.
    b. Operation: Two horizontal-sliding, bypassing sashes.
    c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 6986603 by Labconco).

6. Storage Cabinets: Two (2) 30-inch wide, dual door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9900200 by Labconco).

7. Airflow Monitor: Basis-of-Design Product: 9743203 Guardian 335 Digital Airflow Monitor Kit by Labconco).
8. Cup Sinks: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

    a. Water: Two remote-control, rigid, gooseneck, single-service faucet(s) with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 4005900 by Labconco).

b. Laboratory Gas for Air: Two flange-type fitting(s) with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
c. Laboratory Gas for Gas (Fuel Gas): Two flange-type fitting(s) with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
d. Electrical: One 220 V receptacle pedestal, mounted on the work surface (Basis-of-Design Product: 4005800 by Labconco).
e. Electrical: Two 110V duplex receptacle pedestals, mounted on the work surface (Basis-of-Design Product: 4005800 by Labconco).
f. Electrical: Two 110V duplex receptacles at one end of hood, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.

D. Bench-Top Fume Hood Type H004 – Organic Chemistry Laboratory – Accessible (Basis-of-Design Product: Protector ClassMate 69711601 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

a. Operation: Vertical-sliding, single-hung sash.
b. Operation: Two horizontal-sliding, bypassing sashes.
c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 6986603 by Labconco).

6. Storage Cabinets: Three (3) accessible 12-inch wide, single left hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904500 by Labconco) and Two (2) accessible 12-inch wide, single right hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904200 by Labconco) per hood.

7. Airflow Monitor: Basis-of-Design Product: 9743203 Guardian 335 Digital Airflow Monitor Kit by Labconco).
8. Cup Sinks: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

a. Water: Two remote-control, rigid, gooseneck, single-service faucet(s) with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 4005900 by Labconco).
b. Laboratory Gas for Air: Two flange-type fitting(s) with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
c. Laboratory Gas for Gas (Fuel Gas): Two flange-type fitting(s) with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
d. Electrical: One 220 V receptacle pedestal, mounted on the work surface (Basis-of-Design Product: 4005800 by Labconco).
e. Electrical: Two 110V duplex receptacle pedestals, mounted on the work surface (Basis-of-Design Product: 4005800 by Labconco).

f. Electrical: Two 110V duplex receptacles at one end of hood, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.

E. Bench-Top Fume Hood Type H005 – Chemistry Prep – Standard (Basis-of-Design Product: Protector XStream 1105-10002 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

a. Operation: Vertical-sliding, single-hung sash.
b. Operation: Two horizontal-sliding, bypassing sashes.
c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 9503522 by Labconco).

6. Storage Cabinets: Two (2) 30-inch wide, dual door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9900200 by Labconco).

7. Airflow Monitor: Basis-of-Design Product: 9413400 Guardian Digital Airflow Monitor Kit by Labconco).
8. Cup Sinks: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

a. Water: One remote-control, rigid, single-service faucet with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 9803800 by Labconco).
b. Laboratory Gas for Air: One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
c. Laboratory Gas for Gas (Fuel Gas): One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
d. Electrical: One 220 V receptacle pedestal at one end of hood, mounted on exterior front face of end pilaster.
e. Electrical: Three 110V duplex receptacles at both ends of hood, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.

F. Bench-Top Fume Hood Type H006 – General Chemistry Laboratory – Accessible (Basis-of-Design Product: Protector XStream 1105-10002 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

a. Operation: Vertical-sliding, single-hung sash.
b. Operation: Two horizontal-sliding, bypassing sashes.

c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 9503522 by Labconco).

6. Storage Cabinets: Three (3) accessible 12-inch wide, single left hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904500 by Labconco) and Two (2) accessible 12-inch wide, single right hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904200 by Labconco) per hood.

7. Airflow Monitor: Basis-of-Design Product: 9413400 Guardian Digital Airflow Monitor Kit by Labconco).
8. Cup Sinks: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

a. Water: One remote-control, rigid, single-service faucet with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 9803800 by Labconco).
b. Laboratory Gas for Air: One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
c. Laboratory Gas for Gas (Fuel Gas): One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
d. Electrical: One 220 V receptacle pedestal at one end of hood, mounted on exterior front face of end pilaster.
e. Electrical: Three 110V duplex receptacles at both ends of hood, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.

G. Bench-Top Fume Hood Type H007 – Multi-Disciplinary / Biochem Laboratory – Standard (Basis-of-Design Product: Protector XStream 1104-10002 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

a. Operation: Vertical-sliding, single-hung sash.
b. Operation: Two horizontal-sliding, bypassing sashes.
c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 9503420 by Labconco).

6. Storage Cabinets: One (1) 48-inch wide, dual door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9900000 by Labconco).

7. Airflow Monitor: Basis-of-Design Product: 9413400 Guardian Digital Airflow Monitor Kit by Labconco).
8. Cup Sink: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

a. Water: One remote-control, rigid, gooseneck, single-service faucet with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 4005900 by Labconco).
b. Laboratory Gas for Air: One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
c. Laboratory Gas for Gas (Fuel Gas): One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
d. Electrical: One 220 V receptacle at one end of hood, mounted on exterior front face of end pilaster.
e. Electrical: Three 110V duplex receptacles at both end(s) of hood, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.

H. Bench-Top Fume Hood Type H008 – Multi-Disciplinary / Biochem Laboratory – Accessible (Basis-of-Design Product: Protector XStream 1104-10002 by Labconco):

1. Exterior: Steel with chemical-resistant finish.
2. Ventilation Type: Bypass.
3. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
4. Sash Configuration:

a. Operation: Vertical-sliding, single-hung sash.
b. Operation: Two horizontal-sliding, bypassing sashes.
c. Opening Height: 27 to 30 inches.

5. Work Top: Epoxy resin (Basis-of-Design Product: SpillStopper 9503420 by Labconco).

6. Storage Cabinets: Two (2) accessible 12-inch wide, single left hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904500 by Labconco) and Two (2) accessible 12-inch wide, single right hinge door, powder-coated steel base cabinets (Basis-of-Design Product: Protector Standard Storage Cabinet 9904200 by Labconco) per hood.

7. Airflow Monitor: Basis-of-Design Product: 9413400 Guardian Digital Airflow Monitor Kit by Labconco).
8. Cup Sinks: Polypropylene, 3-by-6-inch (Basis-of-Design Product: 4005200 by Labconco) and lead trap (Basis-of-Design Product: 4005400 by Labconco).
9. Service Fittings:

a. Water: One remote-control, rigid, gooseneck, single-service faucet with vacuum breaker and removable serrated outlet (Basis-of-Design Product: 4005900 by Labconco).
b. Laboratory Gas for Air: One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808400 by Labconco).
c. Laboratory Gas for Gas (Fuel Gas): One flange-type fitting with straight outlet and remote-control ball valve (Basis-of-Design Product: 9808700 by Labconco).
d. Electrical: One 220 V receptacle at one end of hood, mounted on exterior front face of end pilaster.
e. Electrical: Three 110V duplex receptacles at both ends of hood, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.

I. Vented Chemical Storage Cabinet (Basis-of-Design Product: 950S1120 by Thermo Scientific Hamilton Air Flow Products) for storage of large volumes of non-flammable chemicals, reagents and samples.

END OF SECTION 11610