
**SECTION 115313
LABORATORY FUME HOODS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Standard laboratory fume hoods.
- B. Fume hood base cabinets and stands.
- C. Work surfaces.
- D. Laboratory cup sinks in fume hoods.
- E. Service fittings and outlets.
- F. Airflow indicators and alarms.
- G. Piping within fume hoods for service fittings.
- H. Wiring within fume hoods for light fixtures and receptacles.

1.02 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry: Blocking and nailers for anchoring fume hoods.
- B. Section 092116 - Gypsum Board Assemblies: Reinforcements in metal-framed partitions for anchoring fume hoods.
- C. Section 092216 - Non-Structural Metal Framing: Reinforcements in metal-framed partitions for anchoring fume hoods.
- D. Section 096500 - Resilient Flooring: Resilient base applied to base cabinets.
- E. Section 123553.13 - Metal Laboratory Casework: Additional requirements for base cabinets for fume hoods.
- F. Section 230593 - Testing, Adjusting, and Balancing for HVAC: Field quality-control testing of fume hoods.

1.03 REFERENCE STANDARDS

- A. ANSI Z9.5 - Laboratory Ventilation; 2022.
- B. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016, with Errata.
- C. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2026.
- D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.
- F. SEFA 1 - Laboratory Fume Hoods; 2010.
- G. UL 1805 - Standard for Safety Laboratory Fume Hoods and Cabinets; 2006.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.
- B. Preinstallation Meeting: Conduct preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

- C. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide fume hood exterior and interior dimensions and construction, utility and service requirements and locations.
- C. Shop Drawings: Indicate locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, clearances required, locations and types of service fittings.
- D. Samples: Submit two samples of exterior, interior, and work top finish surfaces, 4" X 4" inch (____by____ mm) in size illustrating color and finish.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements. Provide documentation of successful Factory Acceptance Testing.
- F. Test Reports: Indicate that each type of fume hood has been factory-tested and meets specified ASHRAE Std 110 (AM) requirements.
- G. Operation Data: Include description of equipment operation and required adjusting and testing.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- I. Project Record Documents: Record actual locations of concealed utility connections.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.
- C. Preconstruction Testing: Factory-test each type of hood as per referenced standard.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 FIELD CONDITIONS

- A. Ambient Conditions: Maintain temperature and relative humidity at occupancy levels during and after installation of fume hoods.

1.09 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Laboratory Fume Hoods:
 - 1. Bicasa USA Basis of Design.
 - 2. Waldner www.wna
 - 3. Kewaunee Scientific Corp;[____]: www.kewaunee.com/#sle.
- B. Provide laboratory fume hoods from single manufacturer.
- C. Provide laboratory fume hoods from same manufacturer as laboratory casework.

2.02 VARIABLE AIR VOLUME (VAV) FUME HOODS

- A. Restricted-Bypass Fume Hoods:
 - 1. Provide a compensating bypass arrangement above the sash to open after sash is closed to less than 20 percent open. Bypass to maintain exhaust capacity of at least 25 CFM per square foot (127 L/s per square meter) of work surface regardless of sash position.
 - 2. Provide an electronic control unit designed to use input from a sensor that monitors face velocity or sash position to modulate a dedicated exhaust damper in order to maintain a near-constant fume hood face velocity.
 - a. Provide control unit with outputs for interfacing with building's HVAC control system.
 - b. Laboratory air control valves to be provided per mechanical.

2.03 PERFORMANCE REQUIREMENTS

- A. Fume hoods complying with the following when tested in accordance with ASHRAE Std 110:
 - 1. As-Manufactured (AM) Rating: AM 0.01 (0.01 ppm).
 - 2. As-Installed (AI) Rating: AI 0.10 (0.10 ppm).
 - 3. Average Face Velocity: 80 FPM plus or minus 10 percent with sashes fully open.
 - 4. Face-Velocity Variation: Not more than 10 percent of average face velocity across the face opening with sash(es) fully open.
 - a. 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. Static-Pressure Loss: Not more than 1/2-inch w.g. (124 Pa) at 80 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.

2.04 FUME HOODS

- A. General Requirements:
 - 1. Comply with SEFA 1.
 - a. Provide fume hoods UL listed and labeled for compliance with UL 1805.
 - 2. Pre-pipe fume hoods for service fittings.
 - 3. Pre-wire fume hoods for light fixtures and receptacles.
 - a. Terminate all wiring in a junction box on top of hood.
 - 4. Metal Finish performance requirements:
 - a. Metallic parts shall be polyurethane powder coated.
 - b. Abrasion resistance: Maximum weight loss of 5.5 mg. per 100 cycles when tested on a Taber Abrasion Tester #E40101 with 1000 gm wheel pressure and Calibrate #CS10 wheel.
 - c. Hardness: Surface hardness equivalent to 4H or 5H pencil.
 - d. Humidity Resistance: Withstand 1000-hour exposure in saturated humidity at 54 deg C.
 - e. Moisture resistance:
 - 1) No Visible effect to surface finish after boiling water trickled over test panel inclined at 45 degrees for five minutes.
 - 2) No visible effect to surface finish following 100-hour continuous application of a water-soaked cellulose sponge, maintained in a wet condition throughout the test period.

- 3) Adhesion: Score finish surface of test panel with razor blade into 100 squares, mm 1.5 by 1.5 mm, cutting completely through the finish but with minimum penetration of the substrate, and brush away particles with soft brush. Minimum 95 squares shall maintain their finish.
 - 4) Salt spray: Withstand minimum 200-hour salt spray test using ASTM B117 or equivalent test method.
 - 5) All tests to be performed by recognized testing laboratory qualified to perform and certify testing.
- B. Type CO-3 , Fume Hood: Bicasa RX Smart Series
1. Ventilation: Variable Air Volume (VAV).
 2. Configuration: Standing-height; bench mounted.
 3. Nominal Interior Height: 51 inches (1295 mm).
 4. Nominal depth: 36 inches
 5. Nominal width: 83 inches (2100 mm)
 6. Sash Type: Vertical/horizontal combination.
 - a. Leak-free enclosure box, manufacturer's standard construction, for vertical rising sash.
 - b. Horizontal Sashes: By-passing and removable sashes hung from adjustable nylon-tired, ball-bearing sheaves, supported on an overhead stainless-steel track; lower track only for guiding sashes; flush finger pulls and rubber bumpers at both stiles of each sash.
 - c. Glazing: Laminated safety glass.
 - d. Sash Guides: Corrosion-resistant polyvinyl chloride (PVC) track.
 - e. Vertical Sash mechanism: Designed to prevent sash drop in case of mechanism failure.
 - 1) Cable: Minimum 3/32 inch (2 mm) thick stainless steel of construction standard with the manufacturer.
 - f. Vertical Sash Pull: Type 316 stainless steel, with PTFE corrosion-resistant coating.
 7. Top Front Panel: Standard integral grille stamped into panel of same materials as fume hood exterior.
 8. Exterior: Aluminum.
 9. Interior Lining: Phenolic composite.
 - a. Color/Finish: White.
 10. Service Fittings and Fixtures:
 - a. As specified in 123553.13 - Metal Laboratory Casework.and on drawings.
 - b. Cup Sink Type: CS-01: Drop-in Epoxy, complete with removable stainer and waste fitting.
 - 1) Shape: Oval.
 - 2) Size: 3 inches by 9 inches (75 by 228 mm).
 - c. Compressed Air Outlet Fitting Assembly: Model CT022WSA remote fitting L2885N manufactured by Watersaver.
 - d. Vacuum Outlet Fitting Assembly: Model CT022WSA remote fitting L2885N manufactured by Watersaver.
 - e. Water Outlet Fitting Assembly: Model L081WSA Remote fitting L2885W manufactured by Watersaver.
 - f. Vacuum-breaker Assembly: Model L112 manufactured by watersaver.
 - g. Escutcheons: Manufacturer's standard.
 11. Access Panels: Provide removable panels on both sides hood exterior and interior lining panels.
 12. Work Surface:

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- a. Work Top for Fume Hoods Other Than Floor-mounted Type: High temperature/chemically resistant. Ceramic/Stonehard or accepted alternate..
 - 1) Edge: Raised rim with rounded edges and corners.
 - C. Type MS-10 , Fume Hood: Bicasa RX Smart Series
 1. Ventilation: Variable Air Volume (VAV).
 2. Configuration: Standing-height; bench mounted.
 3. Nominal width: 83 inches (2100 mm)
 4. Nominal depth: 36 inches
 5. Nominal Interior Height: 51 inches (1295 mm).
 6. Sash Type: Vertical/horizontal combination.
 - a. Configuration: As indicated on drawings.
 - b. Leak-free enclosure box, manufacturer's standard construction, for vertical rising sash.
 - c. Horizontal Sashes: By-passing and removable sashes hung from adjustable nylon-tired, ball-bearing sheaves, supported on an overhead stainless-steel track; lower track only for guiding sashes; flush finger pulls and rubber bumpers at both stiles of each sash.
 - d. Glazing: Laminated safety glass.
 - e. Sash Guides: Corrosion-resistant polyvinyl chloride (PVC) track.
 - f. Vertical Sash mechanism: Designed to prevent sash drop in case of mechanism failure.
 - g. Vertical Sash Pull: Type 316 stainless steel, with No.4 finish.
 - h. Sliding Safety Shield: Manufacturer's standard removable polycarbonate shield able to slide the full width of fume face opening, with ball-bearing rollers at top for suspension from track at top of sash opening, and guide at bottom to keep shield from swinging.
 7. Top Front Panel: Standard integral grille stamped into panel of same materials as fume hood exterior.
 8. Exterior: Aluminum
 9. Service Fittings and Fixtures:
 - a. As specified in 123553.13 - Metal Laboratory Casework.
 - 1) Sink Type:[SK-02]: Drop-in Epoxy, complete with removable stainer and waste fitting.
 - 2) Shape: Square
 - 3) Size: 16" X 16"
 - b. Compressed Air Outlet Fitting Assembly: Model CT022WSA remote fitting L2885N manufactured by Watersaver.
 - c. Vacuum Outlet Fitting Assembly: Model CT022WSA remote fitting L2885N manufactured by Watersaver.
 - d. Water Outlet Fitting Assembly: Model L081WSA Remote fitting L2885W manufactured by Watersaver.
 - e. Vacuum-breaker Assembly: Model L112 manufactured by Watersaver.
 - f. Escutcheons: Manufacturer's standard.
 10. Access Panels: Provide removable panels on both sides hood exterior and interior lining panels.
 11. Work Surface:
 - a. Work Top for Fume Hoods Other Than Floor-mounted Type: High temperature/chemically resistant. Ceramic/Stonehard or accepted alternate..
 - D. Type CH-5 , Fume Hood: Bicasa RX Smart Series
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1. Ventilation: Variable Air Volume (VAV).
 2. Configuration: Bench mounted.
 3. Nominal width: 71 inches (1800 mm)
 4. Nominal depth: 36 inches
 5. Nominal Interior Height: 51 inches (1295 mm).
 6. Sash Type: Vertical rising.
 - a. Configuration: As indicated on drawings.
 - b. Leak-free enclosure box, manufacturer's standard construction, for vertical rising sash.
 - c. Glazing: Polycarbonate.
 - d. Sash Guides: Corrosion-resistant polyvinyl chloride (PVC) track.
 - e. Vertical Sash Mechanism: Design to prevent sash drop in case of mechanism failure.
 - 1) Cable: Minimum 3/32 inch (2 mm) thick stainless steel of construction standard with the manufacturer.
 - f. Vertical Sash Pull: Type 316 stainless steel, with No.4 finish.
 7. Interior Lining: 3/16 inch thick glass fiber reinforced polyester.
 8. Service Fittings and Fixtures:
 - a. Specialty Gas Fitting Assembly: (Nitrogen) Model CT022WSA remote fitting L2885N manufactured by WaterSaver.
 - b. Compressed Air Outlet Fitting Assembly: Model CT022WSA remote fitting L2885N manufactured by Watersaver.
 - c. Vacuum Outlet Fitting Assembly: Model CT022WSA remote fitting L2885N manufactured by Watersaver.
 - d. Water Outlet Fitting Assembly: Model L081WSA Remote fitting L2885W manufactured by Watersaver.
 - e. Vacuum-breaker Assembly: Model L112 manufactured by Watersaver.
 - f. Escutcheons: Manufacturer's standard.
 9. Access Panels: Removable panels on both sides hood exterior and interior lining panels.
 10. Work Surface:
 - a. Work Top for Fume Hoods Other Than Floor-mounted Type: _____.
 - 1) Edge: Raised rim with rounded edges and corners.
- E. Fume Hood Base Cabinets:
1. See Section 123553.13 - Metal Laboratory Casework.
 2. Exterior construction: Metal cabinets.
 - a. Acid storage cabinets.
 - b. Solvent storage cabinets.
 - c. Vacuum pump cabinets.
 3. Material: Sheet steel.
 4. Color/Finish: As selected from manufacturer's standard line..
- F. Light Fixtures: UL labeled, vaporproof, _____, _____ LED light fixtures. Number and length of fixtures as necessary for fume hood width. Mounted above sealed safety glass panel. White baked-enamel finish on fixture interior.

2.05 FABRICATION

- A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations, or as necessary to permit movement through a 35 inches by 79 inches (889 mm by 2007 mm) clear door opening.
- B. Aluminum Exterior, Air foil, and sash.

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1. Aluminum extruded profiles with internal compartment and snap fit removable panel, side wall total thickness - 1 31/32"
 - C. Ends: Fabricated with double-wall end panels. 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. Lining Assembly: Unless otherwise indicated, Molded unit, consisting of end and back panels bonded together with epoxy adhesive, concealed where possible. Joints sealed by filling with chemical-resistant sealant during assembly.
 1. Punched fume hood lining side or bottom panels for service fittings and remote controls. Removable plug buttons for holes not used for indicated fittings.
 - E. Rear Baffle: Same material as fume hood lining, unless otherwise indicated, at rear of hood with openings at top and bottom, with corrosion-resistant fasteners. Fabricated for removal to facilitate cleaning behind baffle.
 - F. Exhaust Plenum: Full width of fume hood, sized and configured to provide uniform airflow, of same material as hood lining, and with duct stub for exhaust connection.
 1. Duct-Stub Material: Epoxy-coated steel, unless otherwise indicated.
 - G. Airfoil: At bottom of fume hood face opening, with 1 inch (25.4 mm) gap between bottom of airfoil and work top. Sash to close on top of airfoil. Designed to direct airflow across work.
 1. Fabricated from Aluminum
 - H. Comply with requirements of other sections for factory installation of water and laboratory gas service fittings, piping, electrical devices, and wiring. Securely anchor fittings, piping, and conduit to fume hoods, unless otherwise indicated.

2.06 MATERIALS

- A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.
- B. Stainless-Steel Sheet: ASTM A240/A240M or ASTM A666/A666M, Type 304, stretcher-leveled standard of flatness.
- C. Aluminum: Coated extrusions, 1 31/32" total thickness of wall panels.
- D. 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.
- E. Fasteners: Stainless-steel, where exposed to fumes.

2.07 ACCESSORIES

- A. Airflow Monitors/Indicators and Alarms: Provide each fume hood with a airflow monitor/indicator complete with an audible and visual alarm that activates when airflow sensor reading is outside of preset range.
 1. Source: Fume hood manufacturer.
 2. Airflow Monitor/Indicator Functionality:
 3. Airflow Alarm functionality: Audible (85 dB @ 4 inch (102 mm) distance), and visual alarm that activates when airflow sensor reading is outside of preset range.
 - a. Reset and test mode.
 - b. Programmable Switch: Designed to silence audible alarm and automatically reset when airflow returns to within preset range. Warning light to stay on when alarm is silenced.
 - c. Capability for integration with BAS (Building Automation System) via BACnet.

2.08 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Factory testing of each type of fume hood.
- C. Non-Complying Work: See Section 014000.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Locate concealed framing, blocking, and reinforcements that support fume hoods by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- B. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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 indicated requirements for installing water and laboratory gas service fittings, and electrical and telecommunications devices.

3.03 FIELD QUALITY CONTROL

- A. Field test fume hoods as specified below.
 - 1. General: Test fume hoods as installed to assess airflow velocity. Perform tests with static mode (set sash position) conditions. Conduct testing as outlined below for _____ hoods provided in the Project.

3.04 ADJUSTING

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

3.05 CLEANING

- A. 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.

3.06 DEMONSTRATION

- A. Demonstrate proper operation of fume hoods and their accessories to Owner's designated representative.

3.07 FUME HOOD SCHEDULE

- A. See drawings for Fume Hood Schedule.

END OF SECTION 115313