

INDEX TO
SECTION 11 53 13 – LABORATORY FUME HOOD

Paragraph	Title	Page
PART 1 – GENERAL		
1.1	Related Documents	11 53 13-1
1.2	Summary	11 53 13-1
1.3	Performance Requirements	11 53 13-1
1.4	Submittals	11 53 13-1
1.5	Quality Assurance	11 53 13-2
1.6	Product Handling	11 53 13-2
1.7	Coordination	11 53 13-2
PART 2 – PRODUCTS		
2.1	Manufactures	11 53 13-2
2.2	Materials	11 53 13-3
2.3	Free-Standing Fume Hoods	11 53 13-4
2.4	Fabrication	11 53 13-4
2.5	Accessories	11 53 13-6
PART 3 – EXECUTION		
3.1	Installation	11 53 13-6
3.2	Adjusting and Cleaning	11 53 13-6

SECTION 11 53 13
LABORATORY FUME HOOD

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
1. Fume hood base cabinets with countertops.
 2. Laboratory sinks and cup sinks in fume hoods.
 3. Water, laboratory gas, and electrical service fittings in fume hoods.
- B. Related Sections include the following:
1. Section 12 35 53 Laboratory casework.
 2. Fume hood duct connections, including ducts.
 3. Sections for connecting service utilities at indicated point. Piping and wiring for service fittings within fume hoods and casework up to point of connection are specified in this Section.
 4. Electrical connection of fume hoods.

1.3 PERFORMANCE REQUIREMENTS

- A. Containment: Provide fume hoods with the following performance ratings at a face velocity of 100 fpm (0.51 m/s) and a release rate of 4.0 L/min, when tested according to ASHRAE 110:
1. As-Manufactured Rating: AM 0.10 (0.10 ppm).
- B. Structural Performance: Provide fume hood components capable of withstanding the following loads without permanent deformation, excessive deflection, or binding of cabinet drawers and doors:
1. Fume Hood Base Stands: 50-lb/ft. (74-kg/m) countertop, 75 lb/ft. (112 kg/m) on countertop, plus weight of hood.

1.4 SUBMITTALS

- A. Product Data: For each type of laboratory fume hood specified.
- B. Shop Drawings: For laboratory fume hoods. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate locations and types of service fittings, together with associated service connections required.
 2. Indicate plumbing connections, duct connections, electrical connections, and locations of access panels.
 3. Include roughing-in information for mechanical, plumbing, and electrical connections.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for fume hood exterior, cabinets, and each type of top material indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain laboratory fume hoods through one source from a single manufacturer.
1. Obtain through same source from the same manufacturer as laboratory casework specified in Division 12 Section "Wood Laboratory Casework."
- B. Fume Hood Standard: Provide fume hoods complying with the requirements of SEFA 1.1, "Laboratory Fume Hoods--Recommended Practices."
- C. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201 for Category II materials.
1. Subject to compliance with requirements, permanently mark safety glass with certification label of SGCC or another certification agency acceptable to authorities having jurisdiction.

1.6 PRODUCT HANDLING

- A. Coordinate delivery of fume hoods with delivery of other laboratory casework components.
- B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.7 COORDINATION

- A. Coordinate installation of fume hoods with laboratory casework, fume hood exhaust ducts, and plumbing and electrical work.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Desk Manufacturing Co.; Taylor Division.
2. Fisher Scientific, Inc.
3. Kewaunee Scientific Corp.; Laboratory Division.
4. Mohon International, Inc.; Campbell Rhea.
5. Norlab, Inc.
6. St. Charles Manufacturing Co.

2.2 MATERIALS

- A. Steel Sheet: Commercial-quality, cold-rolled, carbon-steel sheet, complying with ASTM A 366 (ASTM A 366M); matte finish; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness.
- B. Stainless-Steel Sheet: ASTM A 666, Type 302 or 304, stretcher leveled, No. 4 finish.
 1. For perchloric acid fume hood linings and countertops, use Type 316L instead of Type 302 or 304.
- C. Epoxy: Factory-molded, modified, epoxy-resin formulation, uniform mixture throughout, full thickness with smooth, nonspecular finish.
 1. Physical Properties: Comply with the following minimum requirements:
 - a. Flexural strength: 15,000 psi.
 - b. Compressive strength: 30,000 psi.
 - c. Hardness (Rockwell M): 100.
 - d. Water absorption (24 hours): 0.02 percent (maximum).
 - e. Heat distortion point: 350 deg F.
 - f. Thermal-shock resistance: Highly resistant.
 2. Flame Spread: 25 or less per ASTM E 84.
 3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, test procedure 3.9.5:
 - a. Acetone: Moderate effect.
 - b. Acetic acid (98 percent): No effect.
 - c. Hydrochloric acid (37 percent): No effect.
 - d. Nitric acid (70 percent): No effect.
 - e. Phosphoric acid (85 percent): No effect.
 - f. Sulfuric acid (33 percent): No effect.
 - g. Benzene: No effect.
 - h. Butyl alcohol: No effect.
 - i. Carbon tetrachloride: No effect.
 - j. Ethyl acetate: No effect.
 - k. Ethyl ether: No effect.
 - l. Formaldehyde: No effect.
 - m. Phenol (85 percent): No effect.
 - n. Xylene: No effect.
 - o. Ammonium hydroxide (28 percent): No effect.
 - p. Sodium hydroxide (50 percent): Moderate effect.
 - q. Zinc chloride: No effect.

- D. Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type 1, Class 1, Quality q3.

2.3 FREE-STANDING FUME HOODS

- A. Provide free-standing fume hoods designed to operate with a face velocity of 100 fpm (0.51 m/s) with sash fully open. As sash is closed, hood exhaust volume decreases and face velocity increases. With sash closed, hood maintains a slight negative pressure to confine fumes and gases.
 - 1. Size (minimum): 72"wide by 32"deep by 80"high
- B. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.
- C. Variable Air Volume Control: Equip fume hoods with an electronic control unit with a sensing device that monitors face velocity and a motorized damper on the exhaust connection that maintains a constant face velocity by controlling air volume in response to control unit.
 - 1. Provide output transmitter on electronic control unit that produces 0- to 10-V, dc signal proportional to fume hood exhaust volume for interface with building's HVAC control system.

2.4 FABRICATION

- A. Steel Exterior: Fabricate from steel sheet, 0.0478 inch (1.2 mm) 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 finish to interior and exterior surface of component parts before final assembly.
- B. Ends: 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.
- C. Interior Lining: Unless otherwise indicated, provide fume hoods with linings of the following material:
 - 1. Material: Stainless steel, 0.0500 inch (1.3 mm) thick
- D. Stainless-Steel Lining Assembly: Welded unit consisting of end panel, top, and countertop; reinforced to form a rigid assembly to which exterior is attached.
 - 1. For perchloric acid and radioisotope fume hood linings, cove corners and weld seams completely, grind smooth, and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. When polishing is completed, passivate and rinse surfaces, and remove foreign matter leaving surfaces chemically clean.
- E. Rear Baffle: Provide baffle, of same material as fume hood lining, at rear of hood with adjustable openings at top and bottom for adjustment of airflow through

hood. Secure baffle to cleats at rear of hood with stainless-steel screws. Fabricate baffle for easy removal for cleaning behind baffle.

1. Provide control adjustment strips at top and bottom with plastic or stainless-steel knobs.
 2. Provide remote-control adjustment from outside front of fume hood, where indicated.
- F. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining.
1. Provide stainless-steel, epoxy-coated steel, or glass-fiber-reinforced polyester duct stub for exhaust connection.
- G. Sash: Provide operable sashes of type indicated. Fabricate from 0.0500-inch- (1.3-mm-) thick stainless steel into 4-sided frame with bottom corners welded and finished smooth. Make top member removable for glazing replacement. Set glazing in chemical-resistant, U-shaped gaskets.
1. Glaze with 5-mm-thick tempered safety glass.
 2. Counterbalance vertical sliding sash with sash weight and stainless-steel cable system. 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.
- H. Lights: Provide a vapor proof, 2-tube, rapid-start, fluorescent light fixture, of longest practicable length, complete with tubes at each fume hood. Shield tubes from hood interior by 1/4-inch- (6.35-mm-) thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Set units so fluorescent tubes are easily replaceable from outside of hood.
1. Provide fluorescent tubes with a color temperature of 3500 K and a minimum color rendering index of 85.
 2. Base Cabinets: Comply with requirements of Laboratory Casework. "
- J. Countertops and Cup Sinks: Unless otherwise indicated, provide countertops and cup sinks as follows:
1. Epoxy Tops: Fabricate with front overhang of 1 inch (25 mm) over base cabinets, formed with continuous drip groove on underside 1/2 inch (13 mm) from edge and with factory cutouts for sinks.
 - a. Top Configuration: Flat, with square edges.
 - b. top Thickness: 3/4 inch (19 mm).
 2. Cup Sinks: 3-by-6-inch nominal size with 1-1/2-inch NPS (DN40) outlets with strainers and tailpieces a minimum of 6 inches, of the same material as sink, or as otherwise approved by Architect.
 3. Unless otherwise indicated, provide epoxy tops and cup sinks.
- K. Fasteners: Provide stainless-steel fasteners where exposed to fumes in hood.

2.5 ACCESSORIES

- A. Service Fittings: Comply with requirements of Division 12 Section "Wood Laboratory Casework."
 - 1. Provide service fittings with exposed surfaces, including fittings, escutcheons, and trim, finished with acid- and solvent-resistant, baked-on plastic coating in manufacturer's standard metallic brown, aluminum, or other color as approved by Architect.
- B. Airflow Indicator: Provide fume hoods with airflow indicator of the following type:
 - 1. Indicator Type: Direct-reading aneroid (Magnehelic-type) gage that measures fume hood exhaust duct static pressure as an indication of airflow.
- C. Features: Provide 240 and 120-volt electrical outlets. Two base cabinets below. One cabinet shall be for flammable storage and one for acid storage.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General: Install fume hoods according to Shop Drawings and manufacturer's written instructions. Install plumb, level, aligned, and securely anchored to building and adjacent laboratory casework. Securely attach access panels but provide for easy removal and secure reattachment. Where hoods abut other finished work, apply filler strips and scribe for accurate fit with fasteners concealed where practical.
- B. Comply with requirements of Division 15 and 16 Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings and manufacturer's written instructions. Securely anchor fittings, piping, and conduit to fume hoods and casework, unless otherwise indicated.

3.2 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. Repair or remove and replace defective work as directed on completion of installation.
- C. 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.

END OF SECTION