SECTION 11 53 13
LABORATORY FUME HOODS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Laboratory fume hoods that shall meet the definition of a Laboratory Fume Hood as stated in the SEFA 1 – 2002 Recommended Practice. (Scientific Equipment & Furniture Association) www.sefalabs.com

   2. Standard airfoil bench hood superstructures shall be tested in accordance with the ASHRAE 110-2016 AM Test Procedure and perform well within the American Conference of Governmental Industrial Hygienists recommendations. Meets strict UL1805 classifications.

B. Related Sections:
   1. Section 12 35 53-13: Laboratory Casework and Furnishings.
   2. Division 22: Furnishing and installation of plumbing utilities and final connections to fume hoods.
   3. Division 23: Furnishing and installation of exhaust duct work and equipment, and final connection, which includes fume hood duct transitions (If necessary).
   4, Division 23: Furnishing and installation of exhaust controls and final connections to hoods. If VAV controls are to be mounted to fume hood, then VAV supplier shall supply cutout information.
   5. Division 26: Furnishing and installation of electrical utilities and final connections to fume hoods.

1.02 DESIGN REQUIREMENTS

A. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.

B. Design fume hoods for consistent and safe air flow through the hood face. Negative variations of face velocity shall not exceed 20 percent of the average face velocity at any designated measuring point as defined in this section.

C. Average illumination of work area: Minimum 100 foot-candles. Work area shall be defined as the area inside the superstructure from side to side

and from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.

D. Fume hood shall be designed to minimize static pressure loss with adequate slot area and rectangular shaped exhaust collar configuration. Average static pressure loss readings taken 3 diameters above the hood outlet from 4 points, 90 degrees apart, shall not exceed the following maximums:

Face Velocity	Measured S.P.L. (W.G.)
80 FPM	0.30 inches
100 FPM	0.45 inches

E. Fume hoods shall be constructed in such a manner as to cause no perceptible increase in sound pressure level over the mechanical exhaust system.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's data for each type of hood specified. Include component dimensions, configurations, construction details, joint details, and attachments. Indicate location, size, and service requirement for each utility connection.

B. Shop Drawings:
1. Provide 3/4 inch = 1'-0" scale elevations of individual and battery of hoods showing cross sections, rough-in and anchor placements, tolerances, and clearances. Indicate relation to other laboratory equipment, surrounding walls, windows, doors, and other building components.
2. Provide 1/4 inch = 1'-0" rough-in plan drawings for coordination with trades.
3. Provide 3 sets of prints.

C. Top Samples: Submit product sample of each type of bench top.

D. Finish Samples: Submit 3-inch by 5-inch samples of color of finish for fume hoods, work surfaces and for other pre-finished equipment and accessories for selection by the Owner's Representative.

E. Test Reports: Submit test reports verifying conformance to specified performance tests, including third-party independent test results.

F. Maintenance Manuals: Provide written instruction manuals outlining operating and safety instructions and proper maintenance procedures.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Fume hoods, casework, work surfaces, laboratory furnishings, and accessories shall be furnished by a single laboratory furniture company.

B. Manufacturer's Qualifications: Modern plant with proper tools, dies, fixtures, and skilled production staff to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:
   1. Ten years or more experience in providing and installation of laboratory casework and equipment of specified.
   2. Ten installations of equal or larger size and requirements.

C. Manufacturer should comply with ISO quality control procedures and standards which are followed under the manufacturer's quality control program.

D. Installer's Qualifications: Factory trained and certified by the manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Schedule delivery of fume hoods and equipment so that spaces are sufficiently complete that material can be installed immediately following delivery.

B. Handling: Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating. Protect all work surfaces throughout construction period with 1/4-inch corrugated cardboard completely covering the top and securely taped to edges.

C. Sash should be strapped to prevent glass damage. Sash weight should be secured leaving chain unstressed to prevent deforming chain catches. Secure fume hood to pallet to prevent shifting during transit.

1.06 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:

1. Building areas requiring the installation of laboratory casework shall be dry and unexposed to adverse weather conditions, which may damage finished materials.
2. Interior building temperatures shall not register below 65 degrees Fahrenheit in areas of casework installation to permit the proper curing of epoxy sealants and adhesives.

1.07 SEQUENCING AND SCHEDULING

A. All overhead mechanical, electrical and plumbing rough-in work shall be complete prior to laboratory casework deliveries.

B. All mechanical, electrical and plumbing rough-in work required along walls and service islands, where lab furnishings are to be installed, is to be complete prior to delivery of materials.

C. Walls and partitions must be in place and finished with at least the primer coat of paint. If finish painting is to take place after lab furnishings, installation, protect the casework and furnishings by covering and masking prior to commencement.

D. All necessary wood or metal blocking must be installed within partitions prior to delivery of casework and furnishings.

E. Overhead soffits and ceiling grid must be in place prior to casework installation.

F. Overhead lighting must be installed and connected prior to casework installation. All flooring required to be placed under lab casework and furnishings must be installed prior to material delivery.

H. Concrete floors must be level within 1/8-inch of level per 10-foot run, non-accumulative, when tested with a straight edge in any one direction.

I. Wet operations to be performed must be complete prior to material deliveries.

1.08 WARRANTY

Provide a 5-year warranty against defects in materials and workmanship. Lifetime warranty on chain mechanism and superstructure.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Casework, fume hood and equipment manufacturer: OnePointe Solutions 1112 Swenson Blvd, Elgin TX. 78621, 866-612-7312. info@onepointesolutions.com / www.onepointesolutions.com

2.02 FUME HOOD MATERIALS

A. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM A366; gauges U.S. Standard and galvanized. Steel must consist of at least 60% recycled content.

B. Stainless steel: Type 304; gauges U.S. Standard.

C. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.

D. Downdraft bypass: Low resistant type, 18-gauge steel chamber, directional louvers – not acceptable. All bypass air shall enter top of bypass chamber and enter hood in a down flow direction. Chamber shall protect user from expelled particulate in the event of an adverse internal reaction.

E. Safety glass: 6mm thick tempered glass

F. Sash chain: ANSI *#35* steel, single strand. Average tensile strength of *2,400* pounds, maximum working load of 480 pounds.

G. Sash guides: Extruded PVC.

2.03 FUME HOOD CONSTRUCTION

A. Fume hood superstructures shall have a full frame construction with a double wall design consisting of an outer metal shell as specified and an inner liner of corrosion resistant material as specified. Attachment of the interior lining material to the steel framing members shall be made with non-metallic fasteners. *(Steel frame members galvanized so paint is not required)* The double wall shall house and conceal steel framing members, attaching brackets and remote service fixture valves.

B. The exterior side panels of the superstructure shall be constructed of painted metal. Side panel shall consist of lower fixed panel should accommodate side splash, upper panel removable. Upper removable panels shall have no exposed fasteners or clips. Panels shall be removable for access into the sidewall. *(Panels shall be removable*

without the use of tools.) Access shall also be gained through removable panels in the interior liner. These interior removable panels of the same material as the liner and shall be gasketed.

C. Each superstructure shall have an internal baffle system of the same material as the interior liner. This baffle system shall provide for safe efficient removal of fumes when the superstructure is connected to a properly installed exhaust system. All baffles shall be removable for cleaning.

D. Unless specified for use in a variable air volume (VAV) system, the superstructures shall be provided with an air bypass feature. The by-pass, located at the upper front interior of the hood, shall open as the sash is lowered, providing for a relatively constant exhaust volume of the fume hood superstructure. Bypass shall be adjustable for both VAV and CAV conditions in the field without the need for tools.

D. LED strip light of maximum length shall be provided on each superstructure. Each fixture shall provide 100 candle powers at the work surface.

E. Exhaust outlets shall be round, 20-gauge type 304 stainless steel. Galvanized or painted outlets are not acceptable. If duct transitions are or reducers are required, they shall be provided by the mechanical contractor.

F. Fume hoods shall have a full view, vertically rising, tempered safety glass with a painted radiused handle. The sash shall not require the use of a center mullion. Sash guides shall be extruded, black PVC.

G. Counterbalance system: Single weight, sprocket and chain, counterbalance system* which prevents sash tilting and permits ease of operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full length of operating sash opening. Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure. Open and close the sash against rubber bumper stops. The sash shall have a counterbalance system that uses a chain drive system of chains, sprockets, and axle to provide positive control of sash movement and be designed to permit one finger operation at any point along full width.
*Sash mechanism has a lifetime warranty.

H. A lower airfoil of 14-gauge #304 stainless steel, standard, shall provide flush entry to the hood (flush with the work surface) In addition, the airfoil

shall have a #304 stainless steel containment trough to catch minor spills along the rim and not in the dish area. The other function to be provided by the airfoil is to provide a continuous sweep of air across the work surface to remove fumes and sweep them into the baffles. *Lower airfoil is available in #316 stainless steel or electro-static, powder coated paint.*

J. Service fixtures and fittings: Color coded hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color coded index buttons.

1. Valves: Needle type with self-centering cone tip and seat of hardened stainless steel. Tip and seat shall be removable and replaceable.
2. Provide piping for all service fixtures from valve to outlet: Galvanized iron or copper for water, air and vacuum and black iron for gas services.
3. Fixtures exposed to hood interior: Brass with chemically resistant color-coded powder coating.
4. Front mounted handles: Polished chrome four-arm handle with nylon color-coded index buttons.
5. Services: As indicated on drawings.

6. Fittings are to be constructed to operate with the following maximum working pressure without leak or failure.
   - Water Fittings: 145 PSI
   - Non-Burning Gas: 145 PSI
   - Burning Gases: 100 PSI
   - Special Water Fittings: 145 PSI
   - Oxygen Fittings: 145 PSI

K. Electrical services: Three wire grounding GFCI type receptacles rated at 120 V.A.C. at 20 amperes. Provide 250 V.A.C. receptacles where specified. Flush plates: Acid resistant thermoplastic.

L. Work surfaces: 1-1/4" thick surface, dished a nominal 3/8” to contain spills.
1. Molded resin work surfaces for hoods with Poly-resin liners.
2. Work surface shall have 6” safety line, optional upon request, routed into dished work surface, filled with yellow resin.

O. Safety Monitor/Alarm System:
Where shown or specified provide Safety Monitor/Alarm System which monitors face velocity and provide audible and visual alarm if face velocity drops below safe levels.

1. Calibration is required once the hood is stationed, and the hood exhaust and room supply systems are balanced. A secondary calibration has been factory set into the alarm's memory only to determine that the alarm is functional and ready for shipment. The primary calibration must be completed in the field.

2. Prior to final fume hood alarm calibration and or field testing, a Test and Balance Report (TAB) must be provided.
2. Alarm Signal: Audible signal and a visual, red large light emitting diode:
   a. Silence pushbutton, which disables the audible alarm, shall be accessible on the front of the safety monitor.
   b. Provide alternate mode in which audible alarm is silenced indefinitely but visual alarm remains activated until the alarm condition is corrected.
   c. When alarm condition is corrected and faces velocity and volume return to specified levels, the Safety Monitor will automatically reset and begin routine monitoring.

2.04 RESTRICTED BYPASS FUME HOODS

A. Bypass shall be sufficient in size to allow 25% flow with sash closed. Bypass must be achieved through low resistance opening at top of front lintel panel. Bypass shall be designed to provide a smooth down flow effect. Bypass shall be adjusted in field to three positions, full open, restricted and closed.

2.07 SOURCE QUALITY CONTROL TESTING OF FUME HOODS

A. Evaluation of manufacturer's standard product shall take place in manufacturer's own test facility, with testing personnel, samples, apparatus, instruments, and test materials supplied by the manufacturer at no cost to the Owner.

B. Submit test report consisting of the following test parameters and equipment for each hood width and configuration specified.

C. Hood shall achieve a rating of 4.0 AM 0.05 PPM or better. Tested to ASHRAE-110-2016 and third-party, independent NIH and NIH modified ASHRAE 110-2016 protocol.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation:
   1. Install fume hoods and equipment in accordance with the manufacturer's instructions. Note: OPS has incorporated internal handles inside the lower fume hood side wall to ease lifting and placement upon the worksurface.
   2. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
   3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

B. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations.

3.02 FIELD QUALITY CONTROL TESTING OF FUME HOODS (if required)

A. Field testing requirements:
   1. Perform tests in field to verify proper operation of the fume hoods before they are put in use, using only qualified personnel.
   2. Perform tests after installation is complete, the building ventilation system has been balanced, all connections have been made, and written verification has been submitted that the above conditions have been met.
   3. Verify that the building make-up air system is in operation, the doors and windows are in normal operating position, and that all other hoods and exhaust devices are operating at designed conditions.
   4. Correct any unsafe conditions disclosed by these tests before request of test procedures.

3.03 ADJUSTING

A. Repair or remove and replace defective work, as directed by Architect or Owner upon completion of installation.

B. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

3.04 CLEANING

A. Clean equipment, touch up as required.

3.05 TRAINING / OPERATIONS MANUAL

A. Fume hood training video and operations manual can be accessed online by scanning the QR code located on the front of the hood within the UL label.

3.06 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of equipment from exposure to other construction activity.

B. Advise contractor of procedures and precautions for protection of material and installed fume hoods from damage by work of other trades.

END OF SECTION