

Vanguard Standard Laboratory Fume Hoods

11 53 13 Laboratory Fume Hoods

1. General

1. Conditions

2. Scope of Work

1. This section covers all materials for the supply of laboratory fume hoods and all required accessories as specified below.
2. Work Includes:
 - A. Fume hoods
 - B. Countertops underneath the hoods
 - C. Sinks, cup sinks and plumbing service fittings integrated in the hoods
 - D. Electrical outlets mounted on the hoods
3. Related Work
 - A. Plumbing, wiring and ventilation connections

3. References

1. ASHRAE Standard **ANSI/ASHRAE 110.2016** – *Methods of Testing Performance of Laboratory Fume hoods.*
2. **ANSI/AIHA Z9.5-2012** *Laboratory Ventilation.*
3. Standards and regulations **MD15128-2013**, *Laboratory fume hoods: guidelines for building owners, design professionals and maintenance personnel* – Government of Canada.
4. **SEFA 1-2010** - *Recommended Practices for Laboratory Fume Hoods.*
5. **OSHA 1910.1450** *Occupational Exposure to Hazardous Chemicals in Laboratories.*
6. **CAN/CSA C22.2 No. 61010-1-2012 (R2017)** *Safety Requirements for Electrical Equipment For Measurement, Control, And Laboratory Use - Part 1: General Requirements (Tri-National Standard, With UL 61010-1 And ANSI/ISA-61010-1 (82.02.01).*
7. **UL 1805 Issued: 2002/06/07 Ed:1** *Standard for Laboratory Hoods and Cabinets.*
8. **National Research Council** *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version.*

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4. Qualifications

1. These specifications are based on Bedcolab's products and shall be considered the minimum quality criteria.
2. The supplier must be a recognized laboratory fume hood manufacturer with a minimum of 5 years of fume hood manufacturing experience and has demonstrated his ability to provide equipment meeting the stated quality standards.
3. The supplier shall meet all recommended practices of the Scientific Equipment & Furniture Association (**SEFA**) and more specifically meet the *SEFA 1-2010 Laboratory Fume Hood Recommended Practices*.

5. Warranty

1. Bedcolab certifies that all components of the laboratory furniture included in this section are guaranteed for a period of one (1) year starting on the date of complete goods shipping.
2. Refers to Bedcolab's warranty document for complete details and limitations.

6. Product Handling

1. The manufacturer must provide proper packaging in order to ensure product integrity up to the final destination.
2. The minimum packaging requirements are as follows:
 - A. Each hood shall be placed on a pallet suitable for forklift handling.
 - B. Each unit must be covered with cardboard corners and wood protection
 - C. Each palletized unit shall be covered with a plastic wrap.

2. Products

1. Materials

1. Commercial quality cold rolled steel sheets as per **ASTM A366-85, class 1**
2. Stainless steel sheets, type **304 or 316 with # 4** satin finish, per **ASTM A240, A480, A666, A262**
3. Polished laminated glass as per **CAN/CGSB.12.1**, first quality, 6 mm (1/4") total thickness
4. High Density Polyethylene (HDPE), **CAS no. 9002-88-4**
5. Fiber reinforced thermoset polyester (FRP) plastic with smooth white chemical resistant finish.

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2. Chemical Fume Hood

1. General

- A. All chemical fume hoods shall be built according to the Scientific Equipment & Furniture Association **SEFA-1-2010** standards. All hoods shall be used as closed working areas, allowing vapors, fumes or other products within the work enclosure to be safely evacuated.
- B. All hoods must be correctly installed and connected (by a mechanical contractor barring any indication to the contrary) to an adequate exhaust system with a face velocity that complies with the applicable regulations.
- C. All hoods must be built in order to minimize loss of static pressure, with appropriate openings and adequate exhaust duct locations.
- D. Air must sweep the working area to prevent the formation of turbulence inside the hood and thus reducing the risks of heavy vapors or other contaminants to escape from the frontal area of the hood.

2. Vanguard Constant Volume Fume Hoods

- A. These hoods are equipped with an air deflector system that controls the incoming air velocity thus providing a constant air exhaust volume.
- B. These hoods are equipped with bypass louvers located at the front upper section of the hood that open as the sash is closed, air sweeps the airfoil counter ledge therefore providing a constant air flow over the work surface.
- C. In addition, the aerodynamic airfoil located under the sash creates a sweeping air movement at the work surface to reduce dead-air pockets and air turbulence at the front of the work surface.
- D. The sash opening is beveled in order to reduce dead air pockets and air turbulence.

3. Vanguard Variable Air Volume Fume Hoods

- A. These hoods, combined with an HVAC control system, shall be designed to vary the hood's exhaust rate to maintain a constant average face velocity throughout the sash travel.
- B. The necessary cut outs and bracket supports for the incorporation of the variable air volume (VAV) Control hardware shall be supplied upon request.
- C. These hoods are equipped with an air deflector system that compensates minimum exhaust air volume required by the VAV exhaust system when the sash opening is lower than 6" (152 mm) or totally closed. An interior adjustable panel made of the same material as the inner shell is then added to the air deflection device over the sash opening to provide a better calibration of the system.

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- D. In addition, the aerodynamic airfoil located under the sash creates a sweeping air movement at the work surface to reduce dead-air pockets and air turbulence at the front of the work surface.
- E. The sash opening is beveled in order to reduce dead air pockets and air turbulence.

3. Hood Construction

1. The hood structure shall be a double wall construction with steel exterior panels painted with the same process as the furniture and a choice of interior finish as described under section 11.H. All steel structural channels, supports and remote-control faucet mechanisms are installed within the wall structure.
2. All steel used in the fabrication of the exterior panels is of premium quality and is finished as described in the furniture section.
3. All screws used to fix the exterior structural channels are zinc-plated steel and all interior liner hardware are made of chemical resistant black nylon.
4. The hood structure must be self-supporting, forming a complete rigid structure to support the inside lining, allowing the replacement of interior lining panels without the need to remove the hood from its installed location.
5. The hoods shall be designed with the following minimum inside dimensions to maximize the working surface: 26½" (673 mm) working surface depth between the baffles and the sash interior; 48" (1220 mm) clear height between the working surface and the inside top of the hood. Wall thickness should not exceed 4¾" (120 mm) to provide a maximum inner working area.
6. Access to faucet valves installed within the side walls is provided through removable access panels made with the same material as the inner lining and removable painted steel exterior side panels.
7. Vertical, combination and split sashes shall all be designed to provide an opening height of 27¼" (692 mm). The front configuration shall be designed to provide a 30¾" (781 mm) height clear view of the inside of the hood. A full-length balanced counterweight mechanism operated by two 1/8" (3 mm) stainless steel wire with 1 ½" (38 mm) ball-bearing nylon roller pulleys, located at the back of the hood keeps sash on track and provides a fingertip control of the sash height. The sash panels are made of ¼" (6 mm) safety laminated glass.
 - A. Vertical Sash
 - i. A full-width corrosion resistant black plastic handle is standard. A full-width stainless steel (type 316-No. 4 finish) handle is available as an option.
 - ii. No frame is supplied around the glass panel
 - iii. Sash side tracks are made of black corrosion resistant polyvinyl chloride (PVC).

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- B. Combination Sash
 - i. Consists of a vertical rising painted steel frame that incorporates horizontal sliding glass panels and a full width painted steel handle. The horizontal sliding glass panels made of ¼" (6 mm) safety laminated glass slide on an aluminum bottom track with an upper PVC guide.
 - ii. The sash side tracks are made of black corrosion resistant polyvinyl chloride (PVC).
- C. Split Sash
 - i. A full-width stainless steel (type 316-No. 4 finish) handle is standard.
 - ii. Frame center structure is made of stainless steel (type 316-No. 4 finish)
 - iii. Sash side tracks are made of black corrosion resistant polyvinyl chloride (PVC).
- 8. The hood contoured face opening shall be beveled with rounded corners to form an aerodynamic opening.
- 9. The airfoil at the bottom of the opening shall be made of a type 316, 16 gauge (1.5 mm) stainless steel with electrical cord opening on both sides allowing the sash to fully close. The airfoil shall be designed to continuously provide a minimum 1" (25 mm) opening under the foil to the work surface even when the sash is in the fully closed position.
- 10. Interior liner: fiber reinforced thermoset polyester (FRP) plastic 3/16" (5 mm) with white smooth chemical resistant finish are supplied with chemical resistant nylon rivets. The following liner materials are also available:
 - A. **Type 304**, 18 gauge (1.2 mm) stainless steel panels mechanically fastened. **(SP4)**
 - B. **Type 316**, 18 gauge (1.2 mm) stainless steel panels mechanically fastened. **(SP6)**
 - C. **Type 304**, 18 gauge (1.2 mm) stainless steel all welded interior with seamless covered corners. **(SW4)**
 - D. **Type 316**, 18 gauge (1.2 mm) stainless steel all welded interior with seamless covered corners. **(SW6)**
 - E. High Density Polyethylene white resin panels **(HDPE)** ¼" (6 mm).
- 11. Interior baffles shall be made of the same material and thickness as the inner hood lining and are at a factory-set position for optimal containment.
- 12. The fume hood shall be equipped with a fluorescent light fixture, a light switch and two duplex 120 V/20A electrical outlets on the front posts. All electrical components shall be pre-wired to a junction box located on top of the hood and are CSA-US/UL approved.

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13. The fluorescent light fixture, including two tubes sized based on the size of the hood, shall be installed on the exterior top side of the hood and isolated from the hood's interior by a ¼" (6 mm) laminated safety glass to protect the lamps from vapors or fumes inside the hood. The chosen lamp must supply a minimum of 80 feet candle measured at the working surface
14. Exhaust ducts are made of type 316, 18 gauge (1.2 mm), 2" (51 mm) high stainless steel with bell-mouth type rounded edges to allow minimum turbulence to air exhaust.

4. Exterior Hood Panels Finishing

1. When fabrication of the unit is completed, all surfaces shall be free of scratches and imperfections. Welds will be ground smooth where necessary. The unit will be washed using a three-stage iron phosphate process for proper surface preparation and subsequently, dried in a dry off oven to remove all humidity traces.
2. A high quality chemical resistant polyurethane paint will then be applied to all surfaces including the interior of door and drawer panels using an electrostatic spray process. The parts will be oven baked for the duration and temperature recommended by the paint manufacturer. Painted surfaces shall conform to **A.A.M.A. 2603**.
3. The painted surfaces shall meet or exceed the SEFA 8 specifications for chemical resistance as specified by the Scientific Equipment and Furniture Association and shall contribute to LEED credits.
4. Technical Performance:
 - A. Adhesion to substrate: 100% 5B (ASTM D3359)
 - B. Hardness: 3H (ASTM D3363)
 - C. Gloss: 60 +/- 5 units on 60°
 - D. Flexibility: 1/4" Conical Mandrel (ASTM D522)
 - E. Impact resistance: 100 in-lb direct: 100 in-lb reverse (ASTM D2794)
 - F. Corrosion resistance: 1000 hr less 1/16" in creepage over B-1000 treated test panels (ASTM D2247)
 - G. Humidity resistance: 1000 hr no blistering over B-1000 treated test panels (ASTM D2247)
5. Colors: twenty colors are available as per Bedcolab's color chart.

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5. Fume Hood Accessories

1. Service Fittings:

- A. Plumbing fittings shall be Water Saver or equivalent.
- B. All service fittings are remotely controlled and shall be of one of the following types:
 - i. Front loaded valves
 - ii. Rod type valves
- C. All components inside the hood chamber shall be finished with an acid and solvent resistant epoxy coating. The remote-controlled handles located on the exterior front post shall be chrome plated.
- D. Water faucets are supplied with a rigid or swivel gooseneck and a panel mounted vacuum breaker.
- E. All other fittings are provided with angled nozzle.
- F. Typical service fitting models are from Water Saver Color Tech front type as follows:
 - i. Cold water — CT740W-9RS
 - ii. Mixing water — CT740W (2X)-9RS
 - iii. Vacuum breaker — CT112WSA
 - iv. Gas — CT740G-CR
 - v. Air — CT740A-CR
 - vi. Vacuum — CT740V-CR

6. Sinks and Cup Sinks

- 1. Cup sinks are solid epoxy resin or polypropylene. Supplied with a 1 ½" (38 mm) threaded tailpiece. Available sizes;
 - A. 6" x 3" x 4" (152 x 76 x 102 mm) Black Polypropylene oval cup sink
 - B. 5.7" x 2.7" x 3.7" (145 x 69 x 94 mm) Black Epoxy resin oval cup sink
 - C. 6.3" x 6" (160 x 152 mm) Black Epoxy resin round cup sink
 - D. 13.6" x 4.4" x 5.8" (345 x 112 x 147 mm) Black Epoxy resin rectangle cup sink
- 2. Sinks are solid epoxy resin. Inside dimensions are _____ (one of the following) with a 1 ½" (38 mm) sink outlet and tailpiece. Available sizes;
 - A. 12" x 8" x 5.8" (305 x 203 x 147 mm) Black Epoxy resin drop in sink
 - B. 16" x 8" x 6.6" (406 x 203 x 168 mm) Black Epoxy resin drop in sink
 - C. 18" x 15" x 7.9" (457 x 381 x 201 mm) Black Epoxy resin drop in sink

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7. Countertop

1. Black **modified thermosetting epoxy resin countertop**. Top thickness is 1 ¼" (32 mm) on the sides and 1" (25 mm) in the central portion of the hood creating a cavity to contain spills inside the hood chamber.

8. Ceiling Enclosure Panels

1. All hood ceiling enclosure panels shall include simple-to-operate means of access to the hood lighting fixture without the use of special tools. Finish shall match superstructure exterior. Closure panel shall conceal view of the sash when the sash is in the open position.