SPECIFICATIONS

VARIABLE AIR VOLUME
FLOOR MOUNT FUME HOODS

1.04 REFERENCE STANDARDS

.1 ANSI/ASHRAE 110 Latest Edition: Method of Testing Performance of Laboratory Fume Hoods

.2 SEFA 1 Latest Edition: Laboratory Fume Hoods

.3 MD15128 Latest Edition: Laboratory Fume Hoods

.4 CSA Z316.5 Latest Edition: Fume hoods and associated exhaust systems

.5 ANSI/AIHA Z9.5 Latest Edition: Laboratory Ventilation

.6 CAN/CSA-C22.2 No. 61010-1-12 + UI;U2; AI UL61010-1:2012 Ed. 3+R21 Nov2018 Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use -Part 1: General Requirements.

.7 UL1805 Latest Edition: Laboratory Hoods and Cabinets

.8 NFPA 45 Latest Edition: Protection for Laboratories Using Chemicals, Chapter 6, Laboratory Ventilating Systems and Hood Requirements

.9 WorkSafeBC Latest Edition: Policies Part 30, Fume Hood (Ventilation Systems)

1.05 DESIGN REQUIREMENTS

.1 **Floor Mount Fume Hoods:**

.1 Are intended to be used when large pieces of apparatus or equipment cannot be accommodated in a bench mount fume hood.

.2 Fume hood shall be designed to function as an enclosed ventilated workspace. Its purpose is to protect the operator from harmful fumes and vapors generated within the enclosure and from a fire or explosion as the result of an ignition.

.3 It shall perform these functions by capturing, containing and exhausting the fumes safely and efficiently out the enclosure and by utilizing the sliding safety glass sash as a shield for the operator's face and body.

.4 Fume hoods will be complete with factory installed electrical fittings, mechanical service fixtures, low airflow alarm/ monitor and accessories as listed under this section.

.5 Supply and Installation of the fume hood are to be by the hood manufacturer as described under this section.

.4 Final mechanical and electrical connections to the building utilities are by others.

.5 **Variable Air Volume (VAV) Restricted By-Pass type.** Face Velocity and sash operating height to be determined by the project design group and owner.

.1 Fume hood shall not have a by-pass to insure that all exhaust air will go through the open sash area and lower airfoil.

.2 Fume hoods shall maintain a constant face velocity regardless of the sash position and/or sash opening area. As the sash is raised or lowered, the VAV system and alarm monitor (supplied and installed by others) will increase and decrease the exhaust volume for the fume hood accordingly.

.3 Static Pressure Loss: Fume hood shall be designed to minimize static pressure loss. Based on an 1825mm (72”) wide unit, average static pressure loss, taken at four points 90 degrees apart, at least two duct diameters above the fume hood exhaust collar, shall not exceed:

Face Velocity	Static Pressure (W.G.)
0.40m/s (80 FPM)	55Pa (0.22 inches)
0.50m/s (100 FPM)	85Pa (0.34 inches)

1. Upper sash at open 450mm (18”)

Face Velocity	Static Pressure (W.G.)
0.40m/s (80 FPM)	25Pa (0.10 inches)
0.50m/s (100 FPM)	42Pa (0.17 inches)

.2 Noise Level: When measured on the ‘A’ scale noise generated by the fume hood shall not exceed 60dBA when measured 6" in front of the sash.

.3 Illumination: Average illumination in the work area will be a minimum of 80 candles where the work area is defined as being from side to side, from back baffle to sash line and from work surface to a height of 30".

.4 Fume hood shall be have front loading type mechanical service fixtures and electrical fittings as specified herein. Mechanical fixtures will be factory pre-piped from outlet to valve and electrical fittings will be pre-wired to a junction

box on the top of the fume hood. All mechanical and electrical hookup to building services will be by the respective sub-trades.

.1 Factory pre-piping of mechanical services from valves to a point 150mm (6") above the fume hood superstructure is **optional.**

.5 Fume hoods shall be available in standard widths of 1220mm (48") 1525mm (60"), 1830mm (72") and 2440mm (96").

1.06 PERFORMANCE REQUIREMENTS

.1 Fume hoods shall be tested and certified and accordingly labeled to Canadian Standards Association (CSA), Underwriters Laboratories (UL) and UL1805 Latest Addition.

.1 CSA/UL:

.1 Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements [UL 61010-1:2012 Ed.3+R:16Nov2018]
.2 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1: General Requirements [CSA C22.2#61010-1-12:2012 Ed.3+U1;U2;A1]
.3 Proper labeling must be affixed to the front of each fume hood listing the classification approvals.

.2 UL1805:

.1 Laboratory Hoods and Cabinets [UL 1805:2002 Ed.1+R:02Jun2006].
.2 The UL1805 standard covers both electrical and mechanical hazards in addition to the flammability of materials and the airflow characteristics.
.3 Proper labeling must be affixed to the front of each fume hood listing the classification to the UL 1805 standard for Laboratory Fume Hoods. UL listings covering electrical fittings only and which do not include all items covered in UL 1805 will not be accepted.
.4 All testing shall be performed in an accredited National Recognized Testing Laboratory (NRTL) test facility.

.2 Containment Testing - “As Manufactured” (AM):

.1 Flow Visualization using local and large volume smoke challenges
.2 Face Velocity Measurements/Profile
.3 Tracer Gas Containment

.2 The manufacture’s fume hood shall be capable of achieving an “As Manufactured” (AM) rating of better than 0.05 PPM at 4 litres per minute (4 AM 0.05) with the vertically rising sash in the full open (27”) position.

.3 Unless otherwise specified, previous test results obtained on the manufacture’s identical hood design and size to the ones specified herein will be acceptable.

.4 Test reports shall be made available on request.

.3 Manufacture’s Test Facility:

.1 All “As Manufactured” (AM) tests shall be performed in the manufacture’s fume hood testing facility.

.2 Room shall be of adequate size to provide unobstructed clearance of at least five feet each side and ten feet in front of fume hood.

.3 Make-up air will be provided to replace the room air exhausted through the fume hood and be capable of maintaining 0.02" w.g. negative pressure.

.4 Make-up air will be provided in a manner that keeps cross drafts in front of hood to less than 0.15m/s (30fpm).

.5 Room ventilation system will be capable of testing fume hoods to face velocities of between 0.30m/s (60 fpm) through 0.51 (100 fpm).

.6 All testing and reports shall be performed and submitted by a third party testing company specializing in this type of certification.

1.07 WARRANTY

.1 Provide a written 1-year warranty for parts, materials, workmanship and labour. Product will be free of defects from date of final acceptance of the fume hood.

.2 Warranty shall not cover damage due to misuse, chemical attack or using the hood not for its design and intended use.

.3 The manufacturer or fume hood supplier shall repair or replace any products found to be defective at no cost to the owner.

.4 Replacement will include any parts, labor, shipping, and travel expenses involved.

1.08 SUBMITTALS

.1 Shop drawings:

.1 Fume hood manufacturer will provide shop drawings, in Autodesk Rivet showing:

.1 Front, top and section views.
.2 Exhaust volumes/static pressures at design Sash Operating Height and face velocity.
.3 Complete dimensioning.
.4 Mechanical rough-in locations.
.5 Product materials overview.
.6 Liner material description.
.7 Work surface description.
.8 Seismic fastening/bracing, if required.
.9 Wiring diagram.
.10 Location and type of mechanical and electrical service fixtures, connection points.
.11 Mechanical service fixture pre-piping.
.12 Exhaust collar locations and diameters.
.13 Supporting base cabinets, if by this section.

.2 Samples:

.1 One set manufacture’s colour chips for the full range of standard colours. Submit the following.

.1 76mm X 76mm (3” X 3") sample of manufactures standard colours.
.2 100mm X 100mm (4” X 4") sample of liner lining material(s).
.3 100mm X 100mm (4” X 4") sample of counter top material(s).

.3 Product data sheets:

.1 Submit manufacturer's product data sheets and/or catalog pages for each mechanical and electrical component.

.1 Electrical Device Listing: All electrical components shall be listed and labeled as being approved a Nationally Recognized Testing Laboratory (NRTL).

.2 Performance Test Reports:

.1 Submit a test report from a third party fume hood testing agency listing testing criteria that the fume hood types and sizes on this project have been tested to ANSI/ASHRAE-110 Latest Edition “As Manufactured” (AM).

.2 Submit a written report on each hood type and size certification that the fume hood(s) to be provided passed the tests defined in 1.06 PERFORMANCE.

2.0 PRODUCTS

2.01 Specification based on products manufactures and supplied by:

H.H. Hawkins Ltd.
107 - 19298 21st Avenue
Surrey, British Columbia, Canada V3Z 3M3
1.800.661.4454 www.hhhawkins.com

2.02 MANUFACTURE’S QUALIFICATIONS

.1 Work under this Section will be by a single manufacturer or supplier in accordance with best industry practices.

.1 Manufacturer shall have a minimum of 5 years’ experience in the manufacture, supply and installation of Laboratory Fume Hoods and their related components.

2.03 ALTERNATES TO SPECIFIED PRODUCT(S)

.1 Proposals for substitutions of Products and Materials must be submitted in accordance with consultant and/or owner requirements.

.2 Consultant will review submissions with-in the time frame listed under Division 1 General Requirements. Bid Closing Date will not be extended due to the time required by the Consultant to review the submission and issue an any Addenda.

.3 Submission requirements:

.1 Description of proposed Alternate with detailed comparison specification of proposed substitution with the specified Product listing any deviations to the specified Product(s).

.2 Manufacturer's Product data sheets and catalog pages for proposed Products.

.3 "As Manufactured" (AM) test report for each size and type of fume hood required for this project, per 1.06.3.

2.04 MATERIALS

.1 Steel: High quality cold rolled mild steel conforming to ASTM A366. Gauges shall be U.S. standard.

.2 Stainless steel: Type 304 or 3I6, number 4 finish. Gauges shall be U.S. standard.

.3 Safety glass: 6mm (7/32") laminated safety glass.

.4 Sash cables: Stainless steel, aircraft grade, uncoated, 3 mm (1/8") diameter.

.5 Cable pulleys: Plastic, ball bearing type, 40 mm (1 1/2") diameter, complete with cable retaining device.

.6 Sash tracks: Poly-vinyl chloride (PVC), corrosion resisting.

.7 Sash pull: Stainless steel, full length, low profile slotted design, I8 gauge, type 316, number 4 finish.

.8 Fasteners:

.1 Interior fastener devices: Stainless steel.

.2 Exterior panel fastener devices: Concealed.

.3 Hidden exterior structure members: Sheet metal screws, zinc coated.

.9 Operating/ Safety Instruction Label:

.1 Plastic label attached to the front exterior of the hood superstructure listing suggested operating instructions and safety information.

2.05 CONSTRUCTION

.1 Floor Mount Laboratory Fume Hoods

.1 **Superstructure:**

.1 Heavy-duty galvanized steel framework, double wall construction, rigid and self-supporting. Maximum wall thickness shall be 120 mm (4¾").

.2 Double Wall Construction: Double wall is made up of a powder coated baked enamel steel exterior and a chemical resisting inner liner. Double wall houses and conceals framing, electrical boxes and wiring and mechanical service fixture valves and piping.

.3 Exterior End Panels: Three piece construction, are independently mounted with the upper side panels being secured with hidden fasteners and are removable without tools.

.4 Front Upper Panel: Secured with hidden metal fasteners and is removable without tools.

.5 Front Posts: House electrical receptacles, light switch, low airflow alarm and mechanical service fixture handles. Cutouts for electrical and mechanical services are only provided where there are needed. Blank cover plates and plastic plugs shall not be allowed. Integrated leveling feet will be installed in the front and rear of each post.

.6 Front Opening: Front air foil style opening with 45° front posts, side and upper fascia panels fabricated from I8 gauge sheet steel with a baked electrostatic powder coat finish.

.2 **Interior Liner**: Refer to 2.05.4

.1 Will be of a corrosion and acid resisting material as listed and specified herein.

.2 Liner shall be attached to the concealed steel framework forming a rigid and completely sealed chamber.

.3 Interior Access panels: Will be fabricated of the same material as the liner, are flush mount, air tight and therefore do not require gaskets.

.3 **Sashes:** (Delete those **NOT** required)

.1 **Dual Vertically Rising**:

.1 Sash assembly is a dual independent "Full View" type with the front vertical view height being 1884 mm (74") including the fixed view panel. The maximum sash opening is 1625 mm (64").

.2 Both vertical rising sashes are fully counter balanced using a single center hung weight running behind the hood and utilizing a continuous stainless steel sash cable with plastic ball bearing pulleys. Sash assemblies will provide exact and positive operation and prevent sash drop in the event of the failure of the sash cable.

.3 Pulleys shall be complete with cable retaining devices. Sash shall open and close against rubber bumpers.

.4 Sash Pull is a slotted low profile design, is full length and fabricated I8 gauge type 316, number 4 finish stainless steel.

.5 Sash stops shall be provided at the 450mm (18") open position on the upper sash unless otherwise specified. They shall have a manual override when lowering the sash below the 450mm (18") opening and an automatic reset when the sash is raised above the 450 (18") open position.

.2 **Horizontal Sliding:**

.1 Sash assembly is "Full View" type with a front vertical view height of 1884mm (74"). Maximum vertical sash opening is 1625mm (64").

.2 Sash assembly is set in an I8 gauge, type 316 stainless steel number 4 finish fully welded frame. Horizontal sliding panes are unframed and are designed so that only a maximum of 50% of the sash can be opened at any one time.

.3 Glass panels will have polished vertical edges and shall be top hung with ball bearing plastic rollers running in an aluminum track. Maximum width of panels shall not exceed 400mm (16").

.3 **Combination Horizontal Sliding/Vertical Rising:**

.1 Sash assembly is a dual independent "Full View" type with the front vertical view height being 1884 mm (74') including the fixed view panel. The maximum sash opening is 1625 mm (64").

.2 Upper vertical sash assembly is set in an I8 gauge, type 316 stainless number 4 finish welded frame. It is fully counter balanced using a single centre hung weight running behind the hood and a continuous stainless steel sash cable. It is designed to offer exact and positive operation and to prevent sash drop in the event of the failure of the sash cable. Pulleys are complete with cable retaining devices. Sash shall open and close against rubber bumpers.

.3 Horizontal sliding panes are unframed and designed so that a maximum of 50% of the sash can be opened at any one time.

.4 Glass panels will have polished vertical edges and shall be top hung with ball bearing plastic rollers running in an aluminum track. Maximum width of panels shall not exceed 400mm (16").

.5 Sash stops shall be provided at the 450mm (18") open position unless otherwise specified. They shall be have a manual override when lowering the sash below the 450mm (18") opening and an automatic reset when the sash is raised above the 450 (18") open position.

.6 Lower sash assembly is a single pane, vertically rising and is fully counter balanced using a single center hung weight running behind the hood and utilizing a continuous stainless steel sash cable with plastic ball bearing pulleys. Sash assembly will provide exact and positive operation and prevent sash drop in the event of the failure of the sash cable.

.7 Pulleys shall be complete with cable retaining devices. Sash shall open and close against rubber bumpers.
Sash Pull is a slotted low profile design, is full length and fabricated I8 gauge type 316, number 4 finish stainless steel.

.4 **Liner Material(s):** (Delete those **NOT** required)

.1 **Polyresin (PR):**

.1 6mm (1/4") thick, solid fiberglass reinforced pressed thermoset resin board, is flame retardant and self-extinguishing. Material offers superior chemical, solvent and corrosion resistance, negligible moisture absorption and a flame spread of less than 20 (UL 723 ASTM E84-80). Flexural strength is a minimum of 14,000 PSI (D790).

.2 Material is white in colour throughout its thickness offering superior light levels. Maximum service temperature is 130 C (266 F).

.3 Exhaust collar is type 316 stainless steel.

.2 **Stainless Steel, stitched welded (ST):**

.1 Type 316 (ST6) OR Type 304 (ST4) stainless steel (choose one), 16 gauge, number 4 finish. The sides and back of the interior liner are formed in one piece with the top of the liner being stitch welded to the back and sides.

.2 Liner has a factory installed mechanically fastened and silicon sealed work surface with a 1/2" high anti-spill front lip. The underside is reinforced with plywood for sound deadening and to prevent twisting, oil-canning or buckling.

.3 Offers excellent heat and solvent resistance and good chemical resistance to most acids. Stainless steel is not recommended for use with chemicals containing chlorides such as Hydrochloric Acid, Hydrofluoric Acid and Sulphuric Acid to 80% solution.

.4 Exhaust collar is stainless steel.

.3 **Polypropylene (PP):**

.1 1/4” thick, solid, flame retardant, self-extinguishing and stressed relieved polypropylene sheet. Liner is rigid and self-supporting. Interior is metal-free. Material is white in colour throughout its thickness.

.2 Offers excellent corrosion resistance to a wide range of acids and solvents. Material has good impact resistance and structural integrity and has little or no water

absorption. Maximum operating temperature is 82C (180F).

.3 Exhaust collar is PVC.

.5 **PVC (PV)** :

.1 1/4" thick, solid, flame retardant poly vinyl chloride sheet. Liner is rigid and self-supporting. Interior is metal-free. Material is white in colour throughout its thickness.

.2 Offers excellent corrosion resistance to a wide range of acids but is not recommended for use with solvents. It has little or no water absorption and possesses natural flame resistant qualities. Flame resistance is rated at UL94V-O. Maximum service temperature is 60C (140F).

.3 Exhaust collar is PVC.

.5 **Baffles:**

.1 Five-piece construction, fabricated from the same material as the fume hood liner. Full width horizontal exhaust slots are located at the top, bottom and midpoint with side vertical slots running full height.

.2 Are factory sized and fixed in place for optimum containment per ASHRAE II0 Latest Edition Tracer Gas testing.

.6 **Exhaust Collar(s):**

.1 Type 316 stainless steel, bell shaped, is round in configuration and does not require transitions from rectangular to round. Diameters will be as detailed.

.2 PVC 6mm (1/4") beveled entry edge, is round in configuration and does not require transitions from rectangular to round. Diameters will be as detailed.

.7 **Ceiling Closure Panels** (Optional):

.1 Fabricated from the same material and gauges as the fume hood exterior.

.2 Panels are set-back design to allow for proper by-pass air operation and to allow the for the removal of the front panel and side panels.
.3 Colour to match fume hood exterior.

.8 **Seismic Anchors** (Where asked for):

.1 Provide seismic anchors for fume hoods and cabinets below fume hoods (if supplied by this section). Anchors will be designed to be removable where access is required for persons with disabilities.

.9 **Electrical:**

.1 LED light fixture is installed on the outside top of fume hood interior with removable housing for ease of lamp replacement.
.2 Light fixture is isolated from the fume hood interior by means of a vapour sealed laminated safety glass panel cemented and sealed in place.
.3 Average illumination in the work area will be a minimum of 80 candles where the work area is defined as being from side to side, from back baffle to sash line and from work surface to a height of 30".
.4 Two I20 volt 20 amp duplex grounding type receptacles and light switch are provided on the front posts of the hood exterior.
.5 All electrical fixtures are to be factory installed and pre-wired to a junction box on top of the hood.
.6 Fume hood shall be certified to the following Standards: CAN/CSA-C22.2 No. 61010-1-12 + U1; U2;A1 UL 61010-1:2012 Ed.3+R:21Nov2018 and UL1805:2002

.12 **Mechanical Service Fittings: Broen-Lab**

.1 Valves are front loading type and factory pre-piped from valve to outlet in the fume hood.
.2 Goosenecks and nozzles are colour coded to their handles in accordance with SEFA7 - 2018.
.3 Fittings are CSA and CGA approved.
.4 Valve Bodies: One piece construction, cast or forged brass with a minimum copper content of 57%.

.1 Cold Water: Ceramic compression ball valve with double sealed Uniflex connection, 1X180 degree turn open to close.

.2 Technical Gases (except vacuum): Brass needle valve, 3X360 degree turn open to close. Double sealed Uniflex connection.

.3 Vacuum: Brass needle valves, 1/4 turn open to close function. Double sealed Uniflex connection.

.4 Burning gases: Brass needle valve, 1/4 turn open to close with Push-In POP-UP safety handle for visual safety.

.5 Fixtures exposed to hood interior:

.1 One piece construction, cast or forged brass with a minimum copper content of 57%.

.2 Finish is a chemical resisting polyester powder coating. Colour is white/ grey.

.3 Goosenecks and nozzles are colour coded to their handles in accordance with SEFA7 - 2018.

.6 Handles:

.1 Polypropylene construction four-arm handle colour coded conforming to SEFA7-2018.

.2 Accessible Use (ADA): One hand operated remote control handles with brass ball valve, 1/4 turn open to close. Maximum pressure to active shall not exceed 5 pounds (22.2N).

2.06 EXTERIOR FINISH

.1 Prior to the start of the painting process, all surfaces will be cleaned and be free of scratches, spot weld marks or other material imperfections. Welds shall be ground smooth.

.2 Components will be thoroughly washed using a three stage metallic phosphate process for proper surface preparation, superior bonding and to eliminate humidity.

.3 An electrostatically applied chemical resistant powder coat finish will then be applied to all individual parts including the interior of door and drawer panels. Components will pass through a baking process with the time and temperature as recommended by the paint manufacturer.

.4 Painted surfaces shall conform to A.A.M.A. 2603 and shall meet or exceed the SEFA 8 specification for chemical resistance as specified by the “Scientific Equipment and Furniture Association”.

.5 Metal Surface Finish Testing:

.1 All metal finishing testing will be to the latest SEFA 8 standards, item 10.0 Cabinet Surface Finish Tests.

.2 Third party, independent test reports will be available upon request.