

**Part 1 General****1.1 REFERENCES**

- .1 The laboratory hoods must conform to the following regulations and standards.
  - .1 ASTM E84-09C, ANSI 2.5, NFPA 255, UL 723, UBC 8-1 (42-1), Standard Test method for Surface Burning Characteristics of Building Materials.

**1.2 PERFORMANCE REQUIREMENTS**

- .1 Requirements:
  - .1 The primary purpose of the chemical fume hood is to act as an engineering control to reduce personnel exposure to hazardous vapors, liquids and particles.
  - .2 Each chemical laboratory hood retrofit components shall be precisely designed and manufactured to maintain or enhance containment at face velocity of 0.4 m/s and to fit the existing dimensions of the hood.
  - .3 Main Components for Retrofit:
    - .1 Fixed Rear Bifurcated Baffle Assembly
    - .2 Airfoil Sill
    - .3 Vortex Displacement Sash Handle
    - .4 Horizontal Sliding Panels
  - .4 Baffles:
    - .1 Rear baffles shall be fixed in place and are not operator adjustable. Baffles shall not move once installed and shall have no associated electric actuators.
    - .2 Moving or adjustable baffles are not acceptable.
  - .5 Airfoil Sill:
    - .1 Hood retrofit components shall include an airfoil sill which shall maintain or improve the sweep of air across the work surface starting at the front lip of the hood to the rear baffle and shall help to capture vapors and particles near the hood work surface.
  - .6 Vortex Displacement Sash Handle:
    - .1 Hood retrofit components shall include a Vortex Displacement Sash Handle. The addition of this sash handle shall maintain or improve hood airflow dynamics and performance.
  - .7 Horizontal Sliding Panels:
    - .1 Repairing, replacement, furnishing, cleaning or repair of all service outlets, accessory fittings, electrical receptacles and switches, plumbing fittings, bench tops, and supporting casework is not in contract.

**1.3 SUBMITTALS**

- .1 Action Submittals:
  - .1 Shop Drawings:
    - .1 Shop drawing submittal shall be met by submission of specific cut sheets indicating retrofit dimensions.

**Part 2 Products****2.1 MANUFACTURERS**

- .1 Manufacturer shall have a laboratory chemical hood test lab on the site of their manufacturing facility where they routinely conduct MD 15128 hood testing.

**2.2 CONSTRUCTION AND MATERIALS**

- .1 Hood Interior Baffle Material and Construction:
  - .1 Liner material must comply with UL 1805, and be listed within NRTL test report as proof of compliance. General Material Properties:
    - .1 Nonflammable, corrosion and chemical-resistant
    - .2 Sheet molded homogenous polyester panels
    - .3 Minimum thickness is 5 mm
    - .4 Smooth, white finish
  - .2 Mechanical Properties:
    - .1 Tensile Strength: 51.7 Mpa
    - .2 Tensile Modulus: 11,700 Mpa
    - .3 Flexural Strength: 145 Mpa
    - .4 Flexural Strength at 130°C : 89 Mpa
    - .5 Compressive Strength: 224 Mpa
    - .6 IZOD Impact Strength (Notched): 4.5 J/cm
  - .3 Flame and Smoke Characteristics:
    - .1 Flame retardant, self-extinguishing, with a flame spread rating of 25 or less in accordance with ASTM E84
    - .2 Oxygen Index: 35%
    - .3 Smoke Density: 115
  - .4 Physical Properties:
    - .1 Water Absorption: 0.4%
  - .5 Chemical Resistance:
    - .1 Splash and Spill Resistance:
      - .1 Suspend sample panel in a vertical plane.
      - .2 Apply five drops of each reagent listed with an eyedropper.
      - .3 Apply liquid reagents at top of panel and allow to flow down full panel height.
    - .2 Fume Resistance:
      - .1 Place 25 milliliters of reagent into 100 milliliters beakers and position panel over beaker tops in the proper sequence. Ensure beaker pouring lip permits air to enter the interior atmosphere.
      - .2 After 24 hours remove panel, flush with water, clean with detergent, rinse, wipe dry and evaluate.
    - .3 Evaluation ratings: Change in surface finish and function shall be described by the following numerical ratings:
      - .1 No Effect: No change in color or gloss.
      - .2 Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.
      - .3 Good: Clearly discernible change in color or gloss, but no significant impairment of function or life.
      - .4 Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
      - .5 Failure: Pitting, cratering or erosion of work surface material; obvious and significant deterioration.
    - .4 Required minimum results for each reagent (Reagent: Fume Resistance Rating, Splash and Spill Resistance Rating):
 

.1 Hydrochloric Acid (37%):	2,1
.2 Sulfuric Acid (33%):	2,1
.3 Sulfuric Acid (77%):	1,1
.4 Sulfuric Acid (96%):	1,2
.5 Formic Acid (90%):	2,1
.6 Nitric Acid (20%):	2,2
.7 Nitric Acid (30%):	1,2
.8 Nitric Acid (70%):	3,2
.9 Hydrofluoric Acid (48%):	2,2
.10 Phosphoric Acid (85%):	1,1

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.11	Chromic Acid (60%):	1,4
.12	Acetic Acid (98%):	1,1
.13	Ammonium Hydroxide (20%):	1,1
.14	Sodium Hydroxide (10%):	1,1
.15	Sodium Hydroxide (20%):	1,3
.16	Sodium Hydroxide (40%):	1,3
.17	Sodium Hydroxide Flake:	1,-
.18	Sodium Sulfide:	1,1
.19	Zinc Chloride:	2,1
.20	Tincture of Iodine:	3,3
.21	Silver Nitrate:	2,1
.22	Methyl Alcohol:	1,1
.23	Ethyl Alcohol:	1,1
.24	Butyl Alcohol:	1,1
.25	Benzene:	1,1
.26	Xylene:	1,1
.27	Toluene:	1,1
.28	Gasoline:	1,1
.29	Dichloro Acetic Acid:	2,2
.30	Dimethyl Formamide:	2,2
.31	Ethyl Acetate:	1,1
.32	Amyl Acetate:	1,1
.33	Acetone:	1,1
.34	Chloroform:	1,1
.35	Carbon Tetrachloride:	1,1
.36	Phenol:	2,2
.37	Cresol:	1,1
.38	Formaldehyde:	1,1
.39	Trichloroethylene:	1,1
.40	Ethyl Ether:	1,1
.41	Furfural:	1,3
.42	Methylene Chloride:	1,1
.43	Mono Chloro Benzene:	1,1
.44	Dioxane:	1,1
.45	Methyl Ethyl Ketone:	1,1
.46	Acid Dichromate:	1,2
.47	Hydrogen Peroxide:	1,1
.48	Napthalene:	1,1

**.2 Airfoil Sill:**

- .1 Airfoil sill shall be constructed of 304 Stainless Steel with polymer vane spacers.

**.3 Vortex Displacement Sash Handle:**

- .1 Sash handle shall be constructed from powder-coated aluminum. The existing sashes and sash configuration shall not be changed with the addition of a new sash handler. Sash handle shall have chemically resistant finish and ergonomic design.

**.4 Horizontal Sliding Panel:**

- .1 Horizontal sliding panel shall be constructed from 304 stainless steel and tempered glass. The tempered glass shall be surrounded on all sides by a stainless steel frame.
- .2 Horizontal sliding panel shall utilize rollers to facilitate movement. Rollers shall travel within a 304 stainless steel channel.
- .3 Horizontal sliding panel shall incorporate a peg that meshes with the Airflow Sill to control movement.
- .4 Horizontal sliding panel shall be movable along the entire width of the fume hood except where another horizontal sliding panel prevents movement.

- .5 Horizontal sliding panel shall be removable from the channel and airflow sill for cleaning and maintenance.

**Part 3 Execution****3.1 INSPECTION**

- .1 Areas adjacent to and interior to chemical laboratory hood shall be inspected by installer to verify owner supplied dimensions and anything else that would pose a problem during installation. Installer shall immediately bring problems to owner's attention for resolution.

**3.2 INSTALLATION**

- .1 General: Installation and testing shall be restricted to installing and testing contractors certified by the manufacturer.

**3.3 TESTING AND COMMISSIONING OF RETROFITTED FUME HOODS**

- .1 Following the installation of the hood retrofit components, the hood performance shall be verified through the completion of fume hood testing using the MD 15128-2013 Laboratory Fume Hoods Guidelines.
- .2 Testing shall be done after all modifications to the fume hood support HVAC systems is complete.
- .3 Tests should include tracer gas tests.
- .4 Tests should include VAV response tests for hoods with VAV systems.
- .5 Test results shall be provided to the Owner within 7 days of the final test

**END OF SECTION**