FUME HOOD SPECIFICATION

SECTION 11610.8

‘PRO’ FUME HOODS
Intended for Hydroflouric use

MOTT MANUFACTURING LTD. **SIGMA SYSTEM™**

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PART 1: GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. This Specification identifies the minimum material and construction standards that are required to deliver a quality installation of laboratory fume hoods. Fume hoods shall be supplied in accordance with the requirements of this Specification. The fume hoods identified in this Specification shall include the miscellaneous metal panels and other related components as identified on the Drawings and that are necessary for the complete installation.

1.2. RELATED WORK SPECIFIED ELSEWHERE

1.2.1. Ductwork connections to fume hood outlet stubs - under Section 15880.

1.2.2. Plumbing connections to fume hood services and cup sinks under Section 15400.

1.2.3. Electrical connections to fume hood services, Section 16100.

1.3. SUBMITTALS

1.3.1. **Shop Drawings:** Submit completely detailed shop drawings of all hood superstructures for review in accordance with requirements of Section 11610.

1.3.2. **Operating Instructions and Data Manuals:** Conform to requirements of Section 01600. Instruction covering safe and proper operation of the fume hood shall be provided in three forms:

1.3.2.1. Submit copy of the corrosion resistant label to be attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories.

1.3.2.2. Written instructions in booklet form providing additional detail information on safe, proper operation and maintenance.

1.4. PRODUCT HANDLING

1.4.1. Package all fume hoods for shipping, handling and storage.

1.5. DESIGN

1.5.1. Fume hoods shall be designed and constructed in accordance with SEFA 1.2-1996 - Laboratory Fume Hoods.

1.5.2. Hoods shall function as ventilated, enclosed work spaces, designed to capture, confine and exhaust fumes, vapours and particulate matter produced or generated within the enclosure.

1.5.3. Fume hoods shall provide safe operation when properly installed and connected to an exhaust system, and shall provide proper evacuation of air volume to permit the fume hoods to operate at specified face velocity. Design hoods for consistent and safe air flow through face of hood with negative variations of face velocity exceeding 20% of average face velocity at any designated measuring point as defined in this Section.

1.5.4. The design of the fume hood enclosure shall be an aerodynamically efficient fume exhaust system, minimizing turbulence within the chamber and the volumes being exhausted from the laboratory.

1.6 Performance Requirements:

1.6.1. Fume Hoods, Sigma Systems "Pro" model, shall be designed to meet or exceed the American Standard for Laboratory Ventilation and the American Industrial Hygiene Association standard as described in ANSI/AIHA Z9.5-1992. This standard of performance shall be verified through testing in accordance with the established protocol as set out by the ANSI/ASHRAE 110-1995 standard.

1.6.2. Manufacturer shall provide copies of test results upon request.

1.7. Factory Fume Hood Test Facility:

1.7.1. Manufacturer of fume hoods shall have the capability within their facility of performing fume hood tests based on the latest ANSI/ASHRAE Specification 110-1995.

PART 2: PRODUCTS

2.1. GENERAL: LABORATORY FUME HOODS

2.1.1. **Basic Materials:** In accordance with requirements of Section 11610, Art. 2.1.

2.1.2. **Fume Hood Materials:**

2.1.2.1. Exterior Panels, Framing Members, and Furring Panels: Cold rolled and levelled mild steel and shall conform to ASTM A366, finished as in Para. 2.3.

2.1.2.2. Screws: Interior fastening devices; truss head stainless steel screws with PVC caps.

2.1.2.3. By-Pass Grilles: 18 Ga thick mild steel directionally louvered upward, finished same as exterior panels.

2.1.2.4. Lower Foil: For hoods, form using 14 Ga Type 316-4 stainless steel with PTFE corrosion resistant coating

2.1.2.5. 6mm thick clear polycarbonate as per Section 11610.

2.1.2.6. Sash guides on track shall be corrosion resistant polyvinyl chloride (PVC).

2.1.2.7. Sash Cable: 3/32" stranded stainless steel

2.1.2.8. Sash Pull: Type 316, 18 Ga thick stainless steel with PTFE corrosion resistant coating.

2.1.2.9. Pulley Assembly For Sash Cable: 1-1/2" diameter nylon rim , ball bearing roller, with cable retaining device.

2.1.2.10. Provide interior access panels on both sides, and secure using special moulded vinyl gasket designed to be removed and reinstalled without use of special tools.

2.1.2.11. Baffle support brackets: fibreglass reinforced polyester thermoset resin of 3/16" thickness.

2.1.2.12 Duct Stubs: Bell shaped Type 316, 18 Ga stainless steel with PTFE corrosion resistant coating.

2.1.3. **Hood Lining:**

2.1.3.1. Poly resin type: Hood linings and baffles shall be Poly Vinyl Chloride of ¼" thickness. Final appearance shall be smooth and white in colour.

2.1.4. **Fume Hood Furring Panels:**

2.1.4.1. Where called for, provide matching furring panels to enclose the space between top edge of fume hoods and the finished ceiling.

2.1.4.2. Panels shall be flanged, notched and reinforced where required to form a well-fitted enclosure, free from oil canning. Secure panels using cadmium-plated, self-tapping screws; panels shall be removable for maintenance purposes.

2.1.4.3. Finish shall match fume hood to which it is connected.

2.2 SIGMA "PRO" FUME HOOD

2.2.1. Construction:

2.2.1.1. Fume hood superstructure shall be double wall construction consisting of an outer shell of sheet steel and an inner hood liner. Double wall shall house and conceal steel framing members, attaching brackets and remote operating service fixture mechanisms. Overall double wall thickness; 4-3/4" maximum.

2.2.1.2. Front double-wall posts shall be pre-punched to accept up to 5 plumbing fittings per side, two electrical duplex outlets, light switch and optional monitor alarm where indicated on drawings. Electrical outlets and light switch shall be factory-

wired and terminate at a junction box on roof of hood. All electrical components shall be UL listed/classified.

2.2.1.3. Exterior panel members shall be fastened by means of concealed devices. Exposed screws are not acceptable.

2.2.1.4. Provide access to remote-controlled fixture valves concealed between walls through removable panels on hood exterior and access panels on both inside liner walls. Assemble hood superstructure, fasten and connect inner and outer frame into a rigid self supporting entity.

2.2.1.5. Install fluorescent lighting fixture on exterior of roof. Provide a 6 mm clear polycarbonate panel on hood "roof", sealed to isolate the lighting fixture from fume chamber. The 2-lamp fixture in each hood shall be largest possible for fume hood size, and shall be rapid start type, UL listed/classified. Provide lamps to fixtures. Average interior illumination levels within the fume chamber shall be 80 foot candles minimum. Ballast shall be sound rated to limit noise level. Finish fixture interior with white baked enamel.

2.2.1.6. Work areas shall be defined as that area inside the superstructure from side to side and from face of baffle to the inside face of sash and from the work surface to a height of 28".

2.2.1.7. Fume hood sash shall be full view type providing a clear and unobstructed side to side view of fume hood interior. Sash shall be clear polycarbonate set into extruded polyvinyl chloride guide. Bottom and side sash rails shall be 18 Ga stainless steel with PTFE corrosion resistant coating. Polycarbonate shall be set into rails with PVC glazing channel. Bottom rail shall be an integral, formed, full width, flush pull and shall be anchored on each side to sash cables at bottom. A single weight, pulley, cable, counter balance system shall be used for vertical operation of sash and prevent jamming to permit one finger operation at any point along full width sash pull and to maintain sash at any position without creep. Sash system shall be designed to prevent sash drop in the event of cable failure. Superstructure shall have a single sash and counter balance system. Sash shall open and close against rubber bumper stops.

2.2.1.8. Hood shall be constant volume type with a built in automatic compensating by-pass to maintain constant exhaust volume regardless of sash position. By-pass shall be positive in action, and controlled by louvered panel in the area immediately above the top portion of the sash when closed. As the sash is lowered, the by-pass design limits the increase in face velocity to a maximum of 4-1/2 times average face velocity as measured with the sash fully open.

2.2.1.9. Perimeter of sash opening shall have a lower air foil and streamlined shape side and top with angled opening toward hood interior. Air shall enter under the bottom horizontal foil through a nominal 1" by-pass when the sash is in the closed position. Bottom foil shall be removable without the use of special tools. Sash shall close on air foil.

2.2.1.10. Two-piece main baffles shall provide controlled air vectors into and through the fume hood and be fabricated of the same material as the liner. Provide exhaust slots on the full perimeter of baffles, with top slot adjustable valve. A fixed, permanently-open, horizontal slot located at 31-1/2" above the work surface shall be provided at the overlapping mid-point of the main baffles.

2.2.1.11. Remote-Control Baffle System (optional)

Adjustment shall be instantaneous, one handed, with a single point control, accomplished while hood is in use, without disturbing apparatus.

2.2.1.12. For safety, fume hood shall maintain essentially constant exhaust volume at any baffle position. Changes in average face velocity and exhaust volume as a result of baffle adjustment shall not exceed 5% for any baffle position at the specified face velocity.

2.2.1.13. Design fume hoods to minimize static pressure loss with adequate slot area around the baffle and the bell shaped exhaust collar configuration. Measured average static pressure loss reading taken three diameters above the hood outlet from four points, 90^{o} apart, shall not exceed the following values based on 60" wide hood:

Face Velocity		Measured Static Pressure Loss	
75 F.P.M.	(0.38 m/s)	0.20"	(45.8 Pa)
100 F.P.M.	(0.51 m/s)	0.35"	(87.1 Pa)
125 F.P.M.	(0.64 m/s)	0.55"	(136.9 Pa)
150 F.P.M.	(0.75 m/s)	0.80"	(199.1 Pa)

2.2.2. Electrical convenience duplex outlets shown mounted on the face of fume hoods shall be installed in front posts and pre-wired to a junction box mounted on top of fume hood superstructure. Electrical devices shall be UL classified/listed.

2.2.3. Attach corrosion resistant labels to units as specified in Para. 1.3.2..2

2.3. FUME HOOD EXTERIOR FINISH

Paint Performance data is available in Appendix 1

2.4. AIR FLOW MONITOR/ALARM (optional)

Specify Model and type required.

PART 3: EXECUTION

3.1 INSTALLATION

3.1.1. In addition to requirements of Section 11610, install fume hoods in positions shown, align and set level with levelling devices.

3.1.2. Work in close cooperation with allied trades installing ductwork, wiring and other services.

3.1.3. Apply small bead of sealant to junction of fume hood counter top and adjacent hood liner.

3.1.4. Turn over to Mechanical Trades, service fitting remote control rods and valves for installation to fume hood superstructure and service lines.

END OF SECTION

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