

APEX-air GP Series Fume Hood Specifications

PART 1 - GENERAL

Summary: The following specification is written to provide the level of design expectation of the owner and architect in regards to the quality/functionality of the product and installation for the fume hoods.

1.1 SECTION INCLUDES

- A. Fume Hoods.

1.2 RELATED SECTIONS

- A. Division 12 Section, "Casework"
- B. Division 12 Section, "Countertops"
- C. Division 12 Section, "Plumbing Fixtures"
- D. Related Work to be Performed by Others:
 - a. Furnishing and installation of plumbing utilities and final connections to fume hoods.
 - b. Furnishing and installation of exhaust duct work and equipment, and final connection of fume hoods.
 - c. Furnishing and installation of electrical utilities and final connections to fume hoods.

1.3 FUME HOOD GENERAL 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% of the average face velocity at any designated measuring point as defined in this section.
- C. Average illumination of work area: Minimum 80 footcandles. 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.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate equipment locations, large scale plans, elevations, cross sections, rough in and anchor placement dimensions and tolerances and all required clearances.
- B. Product Data: Submit manufacturer's data for each component and item of equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements and locations.
- C. Samples: Submit 3 x 6 inch samples of finish for fume hood, work surfaces and for other pre-finished equipment and accessories as required.
- D. Test Reports: Submit test reports on each size and type of hood verifying conformance to test performances specified.
- E. Instructions: Submit for review and approval



- a. Instructions to be inscribed on instruction plate to be attached to hood.
- b. Written instructions in booklet form providing additional details on safe and proper operation and maintenance.

1.5 QUALITY ASSURANCE

- A. Single source responsibility: Fume hood casework, work surfaces, and other equipment and accessories shall be manufactured or furnished by a single furniture company.
- B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled employees to produce high quality fume hoods and equipment, and shall meet the following minimum requirements:
 - a. Ten years or more experience in manufacture of fume hoods and equipment of type specified.
 - b. Ten installations of equal or larger size and requirements.
 - c. UL 1805 Specification: Fume Hood must be Underwriters Laboratories 1805 classified. The 1805 standard covers electrical and mechanical hazards, investigates the flammability of materials and measures the effectiveness of airflow characteristics. Proper labeling must be affixed to the face of each fume hood indicating classification to the UL 1805 standard for Fume Hoods. UL listing covering electrical components only or other listings that do not encompass all issues covered in UL 1805 is insufficient.
 - d. Fume hood compliance with NFPA requirements as it pertains to materials used and construction, as well as the National Electrical Code. UL 1805 signifies that any electrical & methods used comply with NEC (National Electrical Code) and all materials have a flame spread index of less than 25.
- C. Installer's qualifications: Factory certified by the manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.
- C. Handling: Care, such as the use of proper moving equipment, experienced movers, etc., should be used at all times to avoid damaging fume hoods. Until installation takes place, any wrapping, insulation or other method of protection applied to products from the factory should be left in place to avoid accidental damage.
- D. Waste Management and Disposal: The supplier of the fume hoods is responsible for removing any waste or refuse resulting from the installation of, or work pertaining to the fume hoods; thereby leaving the project site clean and free of debris. Trash container/s to be provided by others.

1.7 PROJECT SITE CONDITIONS

- A. Building must be enclosed (windows and doors sealed and weather-tight).
- B. An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place.
- C. Ceiling, overhead ductwork and lighting must be installed; prior to the delivery and installation of the fume hoods.
- D. Site must be free of any further construction such as “wet work.”
- E. All painting is completed and floor tile located below fume hoods is installed.

1.8 WARRANTY

- A. Furnish a written warranty that Work performed under this Section shall remain free from defects as to materials and workmanship for a period of one (1) year from date of acceptance. Defects in materials and workmanship that may develop within this time are to be replaced without cost or expense to the Owner.
- B. The warranty specifically does not cover any product or hardware, which has been incorrectly installed, including poor climate conditions, exposed to excessive loads or abuse.
- C. The warranty is in effect while the product is being used as it was intended and owned by the original purchaser of the products and services covered.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: CiF Lab Solutions 53 Courtland Avenue, Vaughan, ON, Canada L4K3T2
- B. Substitution Limitations:
 - a. Substitutions will be considered only when other manufacturers submit substitution requests in accordance with procurement substitution and/or substitution procedures, or provide a comparable product with the following support information detailed below:
 - b. Written documentation stating specification compliance regarding construction, materials, and standard of quality and manufacturing techniques.
 - c. Note all deviations to the drawings and/or specifications in writing.
 - d. The owner, or its designated representative, reserves the right to reject any proposal that in their opinion fails to meet the criteria established by this specification. Such a decision shall be final.
- C. Approved
 - i. Hamilton
 - ii. Kewaunee

NOTE: Manufacturer's that are listed as basis of design or approved are still obligated to hold ALL specification requirements as called out in this document. There will be NO EXCEPTIONS in materials or fabrication permitted that have not been requested in writing and responded to with approval, during an RFI period prior to bid.



2.2 MATERIALS

- A. Steel: High quality, cold rolled mild steel meeting requirements of ASTM A366; gauges U.S. Standard.
- B. Stainless steel: Type 304; gauges U.S. Standard.
- C. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.
- D. Safety glass: 7/32" thick laminated safety glass.
- E. Sash cables: Stainless steel, uncoated, 1/8" diameter military spec. quality. (MIL-W-83420D-3)
- F. Sash guides: Corrosion resistant poly-vinyl chloride.
- G. Pulley assembly for sash cable: 2" diameter, nylon tired, ball bearing type, with cable retaining device.
- H. Sash pull: Corrosion resistant poly-vinyl chloride with .375inch square, 16 gauge tube inserted inside extruded channel.
- I. Gaskets: PVC for interior access panels. Access panels shall be easily removed and replaced with the use of retainer clips molded into the gasket.
- J. Fastenings:
 - i. Exterior structural member attachments: Machine screws and lock nuts, zinc plated.
 - ii. Interior fastening devices concealed nonmetallic drive rivets.
 - iii. Exterior panel member fastening devices to be concealed. Exposed screws not acceptable.
- K. Instruction plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories, baffle settings and use of sash.

2.3 FABRICATION

- A. Superstructure: Rigid, self-supporting assembly of double wall construction, maximum 5" thick.
 - i. Wall consists of a sheet steel outer shell and a corrosion resistant inner liner, and houses and conceals steel framing members, attaching brackets and remote operating service fixture mechanisms and services. Panels must be attached to a frame both welded and bolted into a self- supporting structure. Panels and brackets attached to eliminate screw heads and metallic bracketry from hood interior.
 - ii. Access to fixture valves concealed in wall provided by removable exterior side panels and gasketed access panels on the inside liner walls.
- B. Exhaust outlet: Round or rectangular, 18 gauge stainless steel.
- C. Access opening perimeter: Air foil or streamlined shape with all right angle corners radiused. Bottom horizontal foil shall provide nominal one inch bypass when sash is in the closed position. Bottom foil shall be removable without use of special tools. Bottom foil shall provide access areas for electrical cords. Bottom foil: Steel with powder coating to increase acid and abrasion resistance.
- D. Fume hood sash: Full view style with clear, unobstructed, side-to-side view of fume hood interior and service fixture connections.



- a. Bottom sash rail: Corrosion resistant poly-vinyl chloride with .375inch square, 16 gauge tube inserted inside extruded channel. Provide integral formed, flush pull the entire width of bottom rail.
 - b. Set safety glass into deep form extruded poly-vinyl chloride glazing channels.
 - c. Counter balance system: Single weight, pulley, cable, counter balance system which prevents sash tilting and permits one finger operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full length of travel. Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure.
 - d. Fume hood liner: Fiberglass reinforced polyester panel; smooth finish and white color in final appearance. Flexural strength: 14,000 psi. Flame spread: 25 or less per U.L. 723 and ASTM E84-80. UL listed.
 - e. Baffles: Baffles providing controlled air vectors into and through the fume hood must be fabricated of the same material as the liner. Provide fixed exhaust slots that are calculated and tested for proven containment. All baffle supports/brackets to be non-metallic.
- E. Service fixtures and fittings: Color coded hose nozzle outlets mounted inside the fume hood and controlled from the exterior with color coded index handles.
- a. Valves: Needle-point type with self-centering cone tip and seat of hardened stainless steel. Tip and seat shall be removable and replaceable.
 - b. Provide piping for all service fixtures from valve to outlet: Copper for water, air and vacuum and black iron for gas services.
 - c. Fixtures exposed to hood interior: Color coded nylon.
 - d. Remote control handles: Black nylon four-arm handle with nylon color-coded index buttons.
- F. Hood light fixture: Two lamp/T8, instant start, UL listed fluorescent light fixture with sound rated ballast installed on exterior of roof. Provide safety glass panel cemented and sealed to the hood roof.
- a. Interior of fixture: White, high reflecting plastic enamel.
 - b. Size of fixture: Largest possible up to 48" for hoods with superstructures up to six feet. Provide two 24" fixtures for hoods with eight foot superstructures.
 - c. Include lamps with fixtures.
- G. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Provide 250 V.A.C. receptacles where specified. Flush plates: Stainless steel.
- H. Work surfaces: 1-1/4" thick epoxy resin, dished a nominal one-half inch to contain spills.
- I. Safety Monitor/Alarm System: Where shown or specified provide Safety Monitor/Alarm System which monitors face velocity and provides audible and visual alarm if face velocity drops below safe levels. The technology used will be thermally compensated thermistor based in the alarm module. As the internal fume hood pressure changes as the sash opening is closed and opened, the flow passing over the thermistor is calibrated to a face velocity which is displayed on the front of the monitor.
- a. Safety monitor: UL listed, tamper proof, with all alarm circuits, electric components, external tubing, and manifolds furnished complete and factory installed. The monitor shall have light emitting diode display which provides clear indication of airflow conditions.



- b. Calibration is the responsibility of the owner and 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.
- c. Airflow sensor: Thermally compensated glass-beaded thermistor, factory connected to a sidewall port on the interior of the fume hood.
- d. Alarm Signal: Audible signal and a visual, red large light emitting diode:
 - i. Silence push button, which disables the audible alarm, shall be accessible on the front of the safety monitor.
 - ii. Provide alternate mode in which audible alarm is silenced indefinitely but visual alarm remains activated until the alarm condition is corrected.
 - iii. When alarm condition is corrected and face velocity and volume return to specified levels, the safety monitor will automatically reset and begin routine monitoring.
- e. Electrical rating: Maximum 12 VDC, and maximum current rating of 200MA.

2.4 BYPASS TYPE FUME HOODS (TYPE 100)

- A. Constant volume type with built-in automatic compensating bypass to maintain relatively constant exhaust volume regardless of sash position.
- B. Bypass: Positive in action and controlled by the sash operation.
- C. Down draft bypass for airflow into the hood from the top front of the superstructure.
- D. As sash is lowered, bypass design shall limit the increase in face velocity to maximum of four times the average face velocity with the sash full open.

2.5 RESTRICTED BYPASS FUME HOODS (TYPE 200)

- A. Bypass shall be restricted allowing air to enter the hood only through the face opening and below the lower airfoil.

2.6 PERCHLORIC ACID FUME HOODS

- A. Bypass design.
- B. Liner, work surface and trough: 16 gauge type 316 stainless steel with all vertical and horizontal corners continuous welded, ground and blended to a fine grained finish. Seamless joints between work surface and sides and back covered to a 1/2" radius. Seams between working surface and sides and back are not acceptable.
- C. Water wash down system: Provide raised edge at front of work surface and continuous trough across the full width at back of the work surface. Include perforated wash down system located behind upper baffle, internal piping, control valve and 1-1/2 inch waste outlet.

2.7 RADIOISOTOPE FUME HOODS

- A. Liner and work surface: 16 gauge type 304 stainless steel with all vertical and horizontal corners continuous welded, ground and blended to a fine grained finish. Seamless joints between work surface and sides and back covered to a 1/2" radius. Seams between working surface and sides and back are not acceptable.
- B. Reinforce work surface to handle heavy loads (200 pounds per sq. ft.) from lead shielding.

2.8 METAL FINISH

- A. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pretreat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
- B. Application: Electrostatically apply powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade furniture quality finish of the following thicknesses:
 - i. Exterior and interior surfaces exposed to view: 1.5 mil average and 1.2 mil minimum.
 - ii. Surfaces not exposed to view: 1.0 mil average.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Installation:
 - i. Install fume hoods and equipment in accordance with manufacturer's instructions.
 - ii. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
 - iii. 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.

3.2 ADJUSTING

- A. Repair or remove and replace defective work, as directed by Architect / Owner upon completion of installation.
- B. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

3.3 CLEANING

- A. Clean equipment, touch up as required.



3.4 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