



(Product shown with optional base cabinets.)

### Ergonomics

- Flush airfoil sill – comfortable for the user while working
- High (43") viewing height – enables operator to properly view interior and procedures
- Side viewing panels – enables others to view the interior and procedures
- Slanted front – provides user comfort
- Chain/sprocket sash counterbalanced – provides ease of operation

### Safety

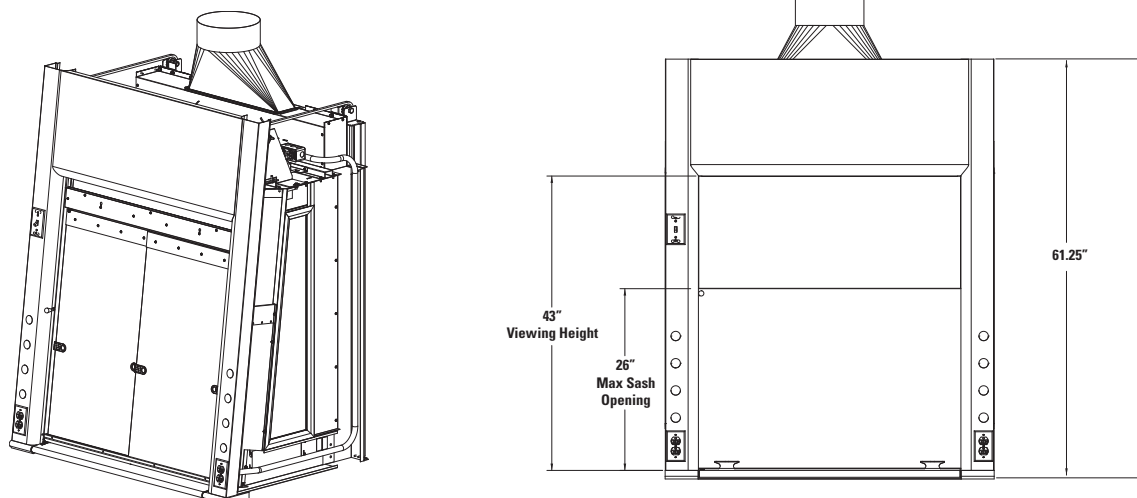
- Maximized viewing area – enables viewing of procedures from anywhere in the lab
- Secondary spill containment
- 18" AutoSash positioning – position sash for user's protection
- ASHRAE 110 tested
- Flush foil eliminates tripping hazard
- Active side post airflow purges sidewall

### Energy

- Optional LED lighting
- Designed for 60 FPM face velocity – minimizes exhaust volume
- VAV (variable air volume) compatible
- Low static pressure – minimizes noise and electrical consumption

### Features

- Petal white color steel interior
- Offered only with front loaded fixtures
- 48" and 60" fume hoods have a 10" round exhaust collar
- 72" and 96" fume hoods have a 12" round exhaust collar
- Pre-wired with two black duplex receptacles and one black light switch



Fume hood designed to address the ever-increasing requirements for safety, energy-efficiency and aesthetics.

- The Advantage™ Fume Hood features enhanced ergonomics for user comfort.
- A full-height slanted front viewing area and side viewing panels enable simple and easy monitoring of precious samples.
- With optional low voltage LED lighting, minimal exhaust static pressure, and variable air volume (VAV) compatibility to minimize exhaust air when the sash is down, the Advantage fume hood provides energy-efficient hazard containment.
- The flush sill enhances safety by eliminating possible glassware tripping hazards.
- AutoSash™ technology maximizes laboratory safety by ensuring correct sash positioning.
- An additional trough is positioned at the front of the unit to catch any spills.

**Advantage Fume Hood CFMs**

Vertical Sash	Fume Hood Width	Exhaust Volume	Vertical Sash Opening	Face Velocity	Static Pressure	Collar Size
	48" (1219 mm)	435	18" (457 mm)	85	0.1	10" (254 mm)
	26" (660 mm)		60			
60" (1524 mm)	570	18" (457 mm)	85	0.13	10" (254 mm)	
		26" (660 mm)	60			
72" (1829 mm)	700	18" (457 mm)	85	0.13	12" (305 mm)	
		26" (660 mm)	60			
84" (2134 mm)	840	18" (457 mm)	85	0.12	12" (305 mm)	
		26" (660 mm)	60			
96" (2438 mm)	975	18" (457 mm)	85	0.14	12" (305 mm)	
		26" (660 mm)	60			

Combination Sash	Fume Hood Width	Exhaust Volume	Vertical Sash Opening	Vertical Face Velocity	Horizontal Sash Opening (H x W)	Horizontal Face Velocity	Static Pressure	Collar Size
	48" (1219 mm)	345	18	70	24-1/2" x 18-3/4"	100	0.07	10" (254 mm)
60								
60" (1524 mm)	455	18	70	24-1/2" x 24-3/4"	100	0.09	10" (254 mm)	
			60					
72" (1829 mm)	555	18	70	24-1/2" x 30"	100	0.09	12" (305 mm)	
			60					
84" (2134 mm)	665	18	70	24-1/2" x 36"	100	0.12	12" (305 mm)	
			60					
96" (2438 mm)	775	18	70	24-1/2" x 42"	100	0.13	12" (305 mm)	
			60					

# Thermo Scientific Hamilton Air Flow Products

Vertical Rising Unframed Sash				
Width	T8 fluorescent lamps		T8 LED lamps	
	33-1/2" Depth	39-1/2" Depth	33-1/2" Depth	39-1/2" Depth
48"	56L250T0	59L250T0	56L250L0	59L250L0
60"	56L251T0	59L251T0	56L251L0	59L251L0
72"	56L252T0	59L252T0	56L252L0	59L252L0
84"	56L253T0	59L253T0	56L253L0	59L253L0
96"	56L254T0	59L254T0	56L254L0	59L254L0

### Common Features

- Petal white color steel interior
- Offered only with front loaded fixtures
- 48" and 60" fume hood have a 10" round exhaust collar
- 72", 84" and 96" fume hood have a 12" round exhaust collar
- Pre-wired with two black duplex receptacles and one black light switch

Combination Sash				
Width	T8 fluorescent lamps		T8 LED lamps	
	33-1/2" Depth	39-1/2" Depth	33-1/2" Depth	39-1/2" Depth
48"	56L250TB	59L250TB	56L250LB	59L250LB
60"	56L251TB	59L251TB	56L251LB	59L251LB
72"	56L252TB	59L252TB	56L252LB	59L252LB
84"	56L253TB	59L253TB	56L253LB	59L253LB
96"	56L254TB	59L254TB	56L254LB	59L254LB

Replacement LED Bulb		
One standard lamp requires 2 (two) replacement bulbs.	36" fixture	48" fixture
	56L31LED	56L41LED

Work Surfaces												
Width	No Cupsink		Left Front Cupsink		Left Rear Cupsink		Right Front Cupsink		Right Rear Cupsink		2 Front Cupsinks	
	Fume Hood Depth		Fume Hood Depth		Fume Hood Depth		Fume Hood Depth		Fume Hood Depth		Fume Hood Depth	
	33-1/2"	39-1/2"	33-1/2"	39-1/2"	33-1/2"	39-1/2"	33-1/2"	39-1/2"	33-1/2"	39-1/2"	33-1/2"	39-1/2"
48"	21L4829000	21L4835000	21L48290LF	21L48350LF	21L48290LR	21L48350LR	21L48290RF	21L48350RF	21L48290RR	21L48350RR	—	—
60"	21L6029000	21L6035000	21L60290LF	21L60350LF	21L60290LR	21L60350LR	21L60290RF	21L60350RF	21L48290RR	21L60350RR	—	—
72"	21L7229000	21L7235000	21L72290LF	21L72350LF	21L72290LR	21L72350LR	21L72290RF	21L72350RF	21L72290RR	21L72350RR	—	—
84"	21L8429000	21L8435000	21L84290LF	21L84350LF	21L84290LR	21L84350LR	21L84290RF	21L84350RF	21L84290RR	21L84350RR	—	—
96"	21L9629000	21L9635000	21L96290LF	21L96350LF	21L96290LR	21L96350LR	21L96290RF	21L96350RF	21L96290RR	21L96350RR	21L96290BF	21L96350BF

Optional Fume Hood End Panels		
Depth	Left End	Right End
33-1/2"	56LLH34D	56LRH34D
39-1/2"	59LLH40D	59LRH40D

Optional Back Enclosure Panel	
Width	Product No.
48"	54L48600LBEP
60"	54L60600LBEP
72"	54L72600LBEP
84"	54L84600LBEP
96"	54L96600LBEP

Fixtures		Package includes all parts necessary to operate fume hood
	Product No.	
Front loaded pre-piped gas	32L715GW	
Front loaded pre-piped air	32L715AW	
Front loaded pre-piped vac	32L715VW	
Front loaded pre-piped CW	32L715CW	

## SECTION 11531

### LABORATORY FUME HOODS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Bench-top laboratory fume hoods.
2. Floor-mounted laboratory fume hoods.
3. Work tops within fume hoods.
4. Laboratory cup sinks in fume hoods.
5. Piping and wiring within fume hoods for service fittings, light fixtures, fan switches, and other electrical devices included with fume hoods.

##### 1.2 PERFORMANCE REQUIREMENTS

###### A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110 at a release rate of 4.0 L/min.:

1. Average Face Velocity: As indicated fpm plus or minus 10 percent with sashes fully open, unless indicated otherwise.
2. Face-Velocity Variation: Not more than 10 percent of average face velocity.
3. Sash Position: Fully open.
  - a. Test hoods with horizontal sashes with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
  - b. Test hoods with combination sashes fully raised, with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
4. As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
5. As-Installed (AI) Rating: AI 0.05 (0.05 ppm).

###### B. Static-Pressure Loss: Not more than 1/2-inch wg at face velocity when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

###### C. Structural Performance: Provide fume hood components capable of withstanding the following loads without permanent deformation, excessive deflection, or binding of cabinet drawers and doors:

1. Base Cabinets of Fume Hoods: 75 lb/ft. within cabinets, 50-lb/ft. work top, 200 lb/ft. on work top, plus weight of hood.

- D. Seismic Performance: Fume hoods, including attachments to other work, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For laboratory fume hoods. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports. Include calculations demonstrating that anchorages comply with seismic performance requirements.
  - 2. Indicate locations and types of service fittings together with associated service supply connection required.
  - 3. Indicate duct connections, electrical connections, and locations of access panels.
  - 4. Include roughing-in information for mechanical, plumbing, and electrical connections.
  - 5. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from above items.
  - 6. Include layout of fume hoods in relation to lighting fixtures and HVAC registers and grilles.
  - 7. Include coordinated dimensions for laboratory equipment specified in other Sections.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Source quality-control reports.
- B. Field quality-control reports.

### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.

### 1.6 QUALITY ASSURANCE

- A. Source Limitations for Laboratory Fume Hoods: Obtain fume hoods from single manufacturer.
- B. Product Standards: Comply with SEFA 1, "Laboratory Fume Hoods - Recommended Practices."
- C. Safety Glass: Products complying with testing requirements in 16 CFR 1201 for Category II materials.
  - 1. Permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 and UL, by a qualified testing agency, and marked for intended location and application.
- E. Preinstallation Conference: Conduct conference at Project site.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

#### 1.9 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for lateral support of fume hoods.
- B. Coordinate installation of fume hoods with laboratory casework, fume hood exhaust ducts, and plumbing and electrical work.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Fisher Hamilton L.L.C.
  - 2. Kewaunee Scientific Corporation; Laboratory Products Group.
  - 3. Lab Crafters, Inc.

#### 2.2 MATERIALS

- A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.
  - 1. For perchloric acid fume hoods, use Type 316L instead of Type 304.

- C. Epoxy: Factory molded, modified epoxy-resin formulation with smooth, nonspecular finish.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Durcon Company (The).
    - b. Epoxyn Products.
    - c. Prime Industries. Inc.
  2. Physical Properties:
    - a. Flexural Strength: Not less than 10,000 psi.
    - b. Modulus of Elasticity: Not less than 2,000,000 psi.
    - c. Hardness (Rockwell M): Not less than 100.
    - d. Water Absorption (24 Hours): Not more than 0.02 percent.
    - e. Heat Distortion Point: Not less than 260 deg F.
    - f. Flame-Spread Index: 25 or less per ASTM E 84.
  3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
    - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
    - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
  4. Color: As selected by Architect from manufacturer's full range.
- D. Glass: Clear, laminated tempered glass complying with ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality-Q3; with clear, polyvinyl butyral interlayer.
- E. Fasteners: Provide stainless-steel fasteners where exposed to fumes.

## 2.3 FUME HOOD VENTILATION

- A. Variable-Air-Volume Control: Where indicated, equip fume hoods with an electronic control unit with a sensing device that monitors face velocity, and a motorized damper on the exhaust connection that maintains a constant face velocity by controlling air volume in response to control unit. Equip units with manual override switch that opens motorized damper to provide maximum exhaust capacity regardless of sash position.

## 2.4 FABRICATION

- A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of being partly disassembled as necessary to permit movement through a 35-by-79-inch door opening.
- B. Steel Exterior: Fabricate from steel sheet, not less than 0.0478 inch thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to

plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.

- C. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.
- D. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.
- E. Interior Lining: Provide one of the following unless otherwise indicated:
  - 1. Stainless steel, not less than 0.050-inch nominal thickness.
  - 2. Polypropylene, not less than 1/4 inch thick.
- F. Lining Assembly: Unless otherwise indicated, assemble with stainless-steel fasteners or epoxy adhesive, concealed where possible. Seal joints by filling with chemical-resistant sealant during assembly.
  - 1. Fasten lining components to a rigid frame assembly fabricated from stainless steel and to which exterior panels are attached.
  - 2. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
- G. Stainless-Steel Lining Assembly: Welded unit consisting of end panels, back panel, top, and work top; reinforced to form a rigid assembly to which exterior is attached.
  - 1. For perchloric acid fume hood linings, cove corners and weld seams completely, grind surfaces smooth and polish as needed to produce uniform, directionally textured finish with no evidence of welds and free of cross scratches. Passivate and rinse surfaces; remove embedded foreign matter and leave surfaces clean.
- H. Rear Baffle: Unless otherwise indicated, provide baffle, of same material as fume hood lining, at rear of hood with openings at top and bottom for airflow through hood. Secure baffle to cleats at rear of hood with stainless-steel screws. Fabricate baffle for easy removal for cleaning behind baffle.
  - 1. Provide adjustable baffles with remote-control adjustment from outside front of fume hood.
  - 2. Provide epoxy-coated, stainless-steel screen at bottom baffle opening to prevent paper from being drawn into the exhaust plenum behind baffles.
- I. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.
  - 1. Duct-Stub Material: Stainless steel; welded for perchloric acid fume hoods.
- J. Bypass Grilles: Provide grilles at bypass openings of bypass and restricted bypass fume hoods.
- K. Sashes: Provide operable sashes of type indicated.



1. Glaze with laminated safety glass.
  2. Counterbalance vertical-sliding sash with sash weight and stainless-steel cable system to hold sash in place regardless of position. Provide ball-bearing sheaves, plastic glides in stainless-steel guides, and stainless-steel lift handles. Provide rubber bumpers at top and bottom of each sash unit.
  3. Fabricate horizontal-sliding sashes hung from adjustable nylon-tired, ball-bearing sheaves supported on an overhead stainless-steel track. Provide a lower track for guiding sashes only. Sashes shall bypass and be removable. Provide flush finger pulls and rubber bumpers at both stiles of each sash.
- L. Front Panels: Punch fume hood front panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
- M. Airfoil: Unless otherwise indicated, provide airfoil at bottom of fume hood face opening with 1-inch space between airfoil and work top. Sash closes on top of airfoil, leaving 1-inch opening for air intake. Airfoil directs airflow across work top to remove heavier-than-air gases and to prevent reverse airflow.
1. Fabricate airfoil from stainless steel.
- N. Light Fixtures: Provide vaporproof, two-tube, rapid-start, fluorescent light fixtures, of longest practicable length; complete with tubes at each fume hood. Shield tubes from hood interior with 1/4-inch-thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Provide units with fluorescent tubes easily replaceable from outside of fume hood.
1. Provide fluorescent tubes with color temperature of 3500 K and minimum color-rendering index of 85.
  2. Provide vaporproof, acid-resistant, incandescent light fixtures complete with 100-W, Type A, long-life bulbs instead of fluorescent fixtures at perchloric acid fume hoods. Provide two fixtures for hoods up to 60 inches long and one fixture for each 24 inches of length for longer hoods.
- O. Perchloric Acid Fume Hood Washdown System: Provide perchloric acid fume hoods with washdown system consisting of stainless-steel spray nozzles, washdown valve, and associated piping. Design system to thoroughly rinse all surfaces of fume hood interior, including areas behind and above baffles, and to direct rinse water toward drain trough at rear of work top. Provide T-fitting for extending system to additional spray nozzles in exhaust ducts.
- P. Work Top and Sinks:
1. Work Tops, General: Provide units with smooth surfaces free of defects. Make exposed edges and corners straight and uniformly beveled. Where acid storage or pump cabinets are indicated beneath fume hoods, provide holes in work tops as need to accommodate cabinet vents.
  2. Resin Work Tops: Provide front overhang of 1 inch, with continuous drip groove on underside 1/2 inch from edge.
    - a. Work Top Material: Solid epoxy composition.

3. Stainless-Steel Work Tops: Made from stainless-steel sheet, not less than 0.062-inch nominal thickness, with No. 4 satin finish. Provide raised (marine) edge around perimeter and extend top down 1 inch at edges with a 1/2-inch return flange under frame. Reinforce underside of top with channels or use thicker metal sheet where necessary to insure rigidity without deflection. Apply heavy coating of heat-resistant, sound-deadening mastic to undersurface.
  - a. Where stainless-steel sinks occur in stainless-steel tops, factory weld into one integral unit.
  - b. For perchloric acid fume hoods, provide stainless-steel work tops with 1/2-inch raised front edge and integral drain trough at back of top with top sloped to trough.
  - c. After fabricating and welding, grind surfaces smooth and polish as needed to produce uniform, directionally textured finish with no evidence of welds and free of cross scratches. Passivate and rinse surfaces; remove embedded foreign matter and leave surfaces clean.
4. Cup Sinks: Material and size as indicated.
  - a. Provide epoxy and polypropylene cup sinks with polypropylene strainers and integral tailpieces.

- Q. Filler Strips: Provide as needed to close spaces between fume hoods and adjacent building construction. Fabricate from same material and with same finish as fume hoods.
- R. Finished Back Panels: Where rear surfaces of fume hoods are exposed to view, provide finished back panels matching rest of fume hood enclosure.
- S. Comply with requirements in other Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings. Securely anchor fittings, piping, and conduit to fume hoods unless otherwise indicated.

## 2.5 CHEMICAL-RESISTANT FINISH

- A. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
  1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
  2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

- A. Service Fittings: Comply with requirements in Section 11534 "Laboratory Fittings and Fixtures."
  - 1. Provide service fittings with exposed surfaces, including fittings, escutcheons, and trim, finished with chrome acid- and solvent-resistant powder coating complying with requirements in SEFA 7 for corrosion-resistant finishes.
  - 2. Service Fitting Locations:
    - a. Cup sink water fixture control inside hood on fixture.
    - b. All other service fittings, fixtures inside hood, control remote on hood face.
- B. Airflow Alarm: Provide fume hoods with audible and visual alarm that activates when airflow sensor reading is outside of preset range.
  - 1. Provide with thermal-anemometer or aneroid (Magnehelic-type) gage airflow sensor.
  - 2. Provide with reset and test switches.
  - 3. Provide with switch that silences audible alarm and automatically resets when airflow returns to within preset range.

## 2.7 SOURCE QUALITY CONTROL

- A. Demonstrate fume hood performance before shipment by testing fume hoods according to ASHRAE 110. Provide testing facility, instruments, equipment, and materials needed for tests.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install fume hoods according to Shop Drawings and manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels, but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Comply with requirements for installing water and laboratory gas service fittings and electrical devices.

### 3.3 FIELD QUALITY CONTROL

- A. Field test installed fume hoods according to ASHRAE 110 to verify compliance with performance requirements.
  - 1. Adjust fume hoods, hood exhaust fans, and building's HVAC system, or replace hoods and make other corrections until tested hoods perform as specified.
  - 2. After making corrections, retest fume hoods that failed to perform as specified.

### 3.4 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.
- B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

### 3.5 FUME HOOD SCHEDULE

- A. FH-1: Bench Top High-Performance Fume Hood Type:
  - 1. Basis-of-Design Product: Fisher Hamilton; Advantage.
  - 2. Ventilation Type: Variable-air-volume control.
  - 3. ASHRAE 110 As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
  - 4. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
  - 5. Sash Configuration:
    - a. Operation: Vertical-sliding, single-hung sash.
    - b. Opening Height: 18 to 26 inches.
  - 6. Operating Face Velocity: 80 fpm.
  - 7. Length: 6 feet.
  - 8. Overall Depth: 33.5 inches.
  - 9. Collar Diameter: 12 inches.
  - 10. Work Top: Epoxy.
  - 11. Cup Sinks: Epoxy.
  - 12. Service Fittings: As indicated on Drawings.
- B. FH-2: Bench Top Perchloric Acid Fume Hood Type:
  - 1. Basis-of-Design Product: Fisher Hamilton; SafeAir.
  - 2. Ventilation Type: Variable-air-volume control.
  - 3. ASHRAE 110 As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
  - 4. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
  - 5. Sash Configuration:
    - a. Operation: Vertical-sliding, single-hung sash.
    - b. Opening Height: 18 to 26 inches.

6. Operating Face Velocity: 100 fpm.
7. Length: 6 feet.
8. Overall Depth: 31 inches.
9. Exhaust Collar: 6 by 23 inches.
10. Work Top: Stainless steel.
11. Service Fittings: As indicated on Drawings.

C. FH-5: Floor-Mounted Fume Hood Type:

1. Basis-of-Design Product: Fisher Hamilton; Concept.
2. Ventilation Type: Variable-air-volume control.
3. ASHRAE 110 As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
4. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
5. Sash Configuration:
  - a. Operation: Combination vertical-sliding and horizontal-sliding.
6. Operating Face Velocity: 80 fpm.
7. Length: 6 feet.
8. Overall Depth: 32 inches.
9. Exhaust Collar: 6 by 23 inches.
10. Floor: As indicated.
11. Service Fittings: As indicated on Drawings.

D. FH-6: Extra Deep Bench Mounted Fume Hood Type:

1. Basis-of-Design Product: Fisher Hamilton; Advantage.
2. Ventilation Type: Variable-air-volume control.
3. ASHRAE 110 As-Manufactured (AM) Rating: AM 0.05 (0.05 ppm).
4. ASHRAE 110 As-Installed (AI) Rating: AI 0.05 (0.05 ppm).
5. Sash Configuration:
  - a. Operation: Vertical-sliding, single-hung sash.
  - b. Opening Height: 18 to 26 inches.
6. Operating Face Velocity: 80 fpm.
7. Length: 6 feet.
8. Overall Depth: 39.5 inches.
9. Collar Diameter: 12 inches.
10. Work Top: Epoxy.
11. Cup Sinks: Epoxy.
12. Service Fittings: As indicated on Drawings.

END OF SECTION

## SECTION 11534

### LABORATORY FITTINGS AND FIXTURES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Laboratory fittings and fixtures
2. Sinks.

###### B. Related Requirements:

1. Division 15: Furnishing and installation of piping, drainline, traps, final connections and setting of sinks and fixtures.
2. Division 15: Furnishing and installation of exhaust ductwork, transition(s), blowers and equipment, and final connection to fume hood(s).
3. Division 16: Furnishing and installation of electrical wiring, conduit and/or electrical items and final connections.

##### 1.2 ACTION SUBMITTALS

###### A. Product Data: For each type of laboratory fittings, fixtures and accessories

###### B. Shop Drawings: Refer to Section 12310 "Manufactured Metal Casework" for laboratory casework and fittings showing plan layout, elevations, ends, cross-sections, service run spaces, location and type of service fittings, together with associated service supply connection required.

1. Submit shop drawings as one complete submittal that includes all items specified in this section. Submittals that include only part of the specified items of this section are not acceptable and will be rejected.
2. Coordinate shop drawings with other work involved.
3. Include manufacturer's recommendations for blocking and securing of laboratory casework units and fittings.

###### C. Samples: Submit the following:

1. One sample of each mechanical and electrical service fitting specified, complete with fittings and accessories and in specified finish.
2. Sample units will be used to demonstrate aesthetic effects as well as functional performance of materials and execution. Sample units may not be incorporated in work.

##### 1.3 QUALITY ASSURANCE

- A. **Single Source Responsibility:** Laboratory Casework manufacturer shall coordinate locations and installation of tops, sinks, and service fittings for single responsibility within the laboratory areas and rooms.
- B. **Installer:** Installer of laboratory casework shall be trained and certified by the manufacturer of the casework.
- C. **Catalog Standards:**
  - 1. Manufacturer's catalog numbers may be indicated for convenience in identifying certain laboratory service fittings. Unless modified by notation on drawings or otherwise specified, catalog description for indicated number constitutes requirements for each item.
  - 2. The use of catalog numbers and specific requirements set forth in drawings and specifications are not intended to preclude the use of comparable products of other acceptable manufacturers, but are given for purpose of establishing standard of design and quality for materials, construction, and workmanship.
- D. Provide laboratory service fittings in conformance with SEFA 7, "Recommended Practices for Fixtures."

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver laboratory fittings and fixtures only after building is enclosed, weathertight, and wet operations in building are completed.
- B. Protect finished surfaces from soiling and damage during handling and installation. Cover with polyethylene film or other protective covering.

#### 1.5 PROJECT CONDITIONS

- A. **Environmental Limitations:** Do not deliver or install laboratory service fittings and fixtures until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not begin installation of fittings and fixtures until installation of adjacent and supporting laboratory casework is complete.

#### 1.6 COORDINATION

- A. Coordinate installation of laboratory service fittings with installation of laboratory casework, fume hoods and other laboratory equipment.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Epoxy Sinks:
  - a. Durcon Incorporated.
  - b. Epoxyn Products.
  - c. Prime Industries, Inc.
2. Laboratory Service Fittings:
  - a. WaterSaver Faucet Co.
  - b. Broen.
  - c. Chicago Faucet.

## 2.2 SINKS, GENERAL

- A. Sizes: As indicated or manufacturer's closest stock size of equal or greater volume, as acceptable to Architect.
- B. Drain Outlet and Tail Piece: 1-1/2 inch diameter, 6 inch minimum length, fabricated of same material as sink wherever possible, or as otherwise acceptable to Architect.
- C. Overflows: For each sink, except cup sinks, provide overflow of standard beehive or open top design with separate strainer; height 2 inch less than sink depth; same material as sink.

## 2.3 CAST EPOXY RESIN SINKS

- A. Nonspecular, integrally molded in one piece with surfaces smooth, corners coved and bottom sloped to outlet. Minimum physical properties and chemical resistance as specified for cast epoxy resin tops; 1/2 inch minimum thickness.
  1. Color: As selected by Architect.
- B. Install sinks using the following mounting method(s):
  1. Flush mount (drop-In).

## 2.4 STAINLESS STEEL SINKS

- A. Fabricate from 0.0516 inch thick, Type 302/304 stainless steel, No. 4 satin finish, unless otherwise indicated. Fabricate with horizontal and vertical corners rounded and coved to at least 5/8 inch radius. Slope sink bottoms to pitch to outlet. Provide double wall construction for sink partitions with top edge rounded to at least 1/2 inch diameter. Provide continuous butt welded joints. After fabricating and welding, grind surfaces smooth and polish as needed to produce uniform finish with no evidence of welds and free of cross scratches. Passivate and rinse surfaces; remove embedded foreign matter and leave surfaces clean.
  1. Punch holes for fittings at factory.



2. Provide with stainless-steel strainers and tailpieces.
  3. Provide with integral rims or sink ring, set in mastic or sealant to form a positive seal with top.
  4. Apply 1/8-inch- thick coating of heat-resistant, sound-deadening mastic to undersink surfaces.
  5. Provide with drainboard where indicated of uniform finish with no evidence of welds.
- B. Where stainless steel sinks are integral with stainless steel tops, weld sink units to tops and finish to produce an invisible joint line.
- C. Legs: At floor mounted sinks provide stainless steel legs.

## 2.5 CUP SINKS

- A. Cast epoxy resin, polyolefin, polypropylene, glass, or stainless steel, as indicated.
- B. Conform to requirements for materials as specified for tops or sinks, or provide units as recommended by manufacturer.
- C. Where stainless steel cup sinks are integral with stainless steel tops, weld to top and finish to produce an invisible joint line. Furnish with tailpiece integral with cup sink. When installed in fume hood worksurfaces, raise lip of cup sink approximately 1/4 inch and round edge.
- D. Provide stainless steel strainer (splash guard) at top of sink.

## 2.6 LABORATORY SERVICE FITTINGS

- A. Laboratory service fixtures including those provided as an integral part of other laboratory equipment (e.g., fume hoods), shall be the product of one manufacturer, unless otherwise noted.
- B. Service fixtures are identified by manufacturer model number indicated in the "Fixture Types" schedule.
- C. Provide units complete with washers, locknuts, unions, nipples and other accessories for positive mounting to supporting laboratory units. Include wall and deck flanges, escutcheons, panel mounted valves-front loaded, and similar items required.
- D. Factory-assemble service fixtures including assembly of valves and shanks to turrets, flanges, and other mounting accessories.
- E. Testing: Test valves individually at the following pressures:
1. Standard Needle Valves: 190 psi air pressure for working pressure of 125 psi.
  2. Fine Control Needle Valves: 300 psi nitrogen pressure for working pressure of 200 psi.
  3. Laboratory Ball Valves: 125 psi air pressure for working pressure of 75 psi.
- F. Materials: Fabricate service fittings from cast or forged brass containing minimum 85 percent copper. Fabricate replaceable seats, needle cones, valve disc screws, and other accessories from monel or stainless steel alloy of a type suitable for intended use.

G. Hose Ends:

1. Provide ten serration tapered hose ends with 3/8 inch dia. IPS thread and 1/8 inch dia. orifice.
2. Provide angle ten serration hose ends where indicated.
3. Refer to "Laboratory Fixture Schedule".

H. Turrets: Furnish with 3/8 inch IPS female inlet thread, brass shanks, brass locknuts, and washers.

I. Flanges: Furnish with 3/8 inch IPS female inlet, unless otherwise indicated.

J. Mounting Shanks: 3/8 inch IPS mounting shank with locknut and washer.

K. Goosenecks: Where goosenecks are indicated to swing, swivel point shall be at turret if deck mounted or at valve level if wall or panel mounted; swing joints shall have heavy teflon packings; "O" rings in swing joints are not acceptable.

L. Handles: Provide 4 arm forged brass or aluminum handles for valves, stops, faucets, remote controls, or for types indicated and wrist blades at sink locations.

M. Hand of Fittings: Furnish right hand fittings unless indicated otherwise.

N. Finish: Provide exposed surfaces, including fittings, escutcheons, and trim with acid- and solvent-resistant finish selected by Architect.

1. Polished Chrome with Clear Epoxy Coating: Polish and buff exposed surfaces, then electroplate with one layer of nickel and one layer of chrome. Each layer of plating shall cover all visible areas. Following plating, thoroughly clean and degreases surfaces to be coated; apply clear epoxy coating and cure by baking. Minimum coating thickness: 2.0 mils.

O. Chemical Resistance of Finishes: Subject coated samples to the following tests:

1. Fume Test: Suspend coated samples in a container of at least 6 cubic ft capacity, approximately 12" above open beakers, each containing 100 cc of 70 percent nitric acid, 94 percent sulfuric acid and 38 percent hydrochloric acid, respectively. After exposure to these fumes for 150 hours, finish shall not show discoloration, disintegration, or other defect.
2. Direct Application Test: Subject coated samples to direct action of the reagents and solvents listed below at a temperature of 25 degC dropping from a burette at the rate of 60 drops per minutes. Finish shall not rupture; slight discoloration or temporary softening is permitted.
3. Acetic acid (98 %), acetone, ammonium hydroxide (28%), benzene, carbon tetrachloride, ether, ethyl acetate, ethyl and other alcohols, formic acid, hydrochloric acid (38%), hydrofluoric acid (48%), methanol, methyl ethyl ketone, naphthalene, nitric acid (70%), phosphoric acid (75%), sulfuric acid (87%), toluene, xylene.

P. Service Outlet Identification:

1. Provide plastic index discs with identification letters at each service fitting handle or knob. Identify services as follows:

<u>SERVICE</u>	<u>COLOR</u>	<u>CODE</u>	<u>LETTER COLOR</u>
Compressed Air	Orange	Air	Black
Gas	Dark Blue	Gas	White
Vacuum	Yellow	Vac	Black
Hot water	Red	HW	White
Cold water	Dark green	CW	White
DI water	White	DI	Black
Nitrogen	Brown	NIT	White
Special gases	Light blue	(as required)	Black
Cooling Water	Green	LCW	White

Q. Standard Needle Valves:

1. Provide standard needle valve of brass or Type 316 stainless steel construction with floating stainless steel needle that self-centers on valve seat and forms a matched fit with the seat, improving with use; replaceable stainless steel seat threads into valve body. Molded TFE stem packing with adjustable packing nut that permits take-up of wear; fine stem threads provide good metering of flow.
2. Valve goes from closed to fully open in 2 full revolutions of handle; four-arm style handle of forged brass or molded nylon.
3. Needle valves shall be fully assembled and individually tested at 190 PSI air pressure under water. Maximum working pressure shall be 125 PSI air pressure.
4. Where used for oxygen and other pure gases, valves shall be cleaned, lubricated, and packed to maintain purity of media.

R. Fine Control Needle Valves:

1. Provide standard needle valve of brass or Type 316 stainless steel construction with floating stainless steel needle that self-centers on valve seat and forms a matched fit with the seat, improving with use; replaceable stainless steel seat threads into valve body. Molded TFE stem packing with adjustable packing nut that permits take-up of wear; ultra-fine stem threads provide micro-control of flow.
2. Valve goes from closed to fully open in 8 full revolutions of handle and shall be capable of delivering one bubble of gas at a time; four-arm style handle of forged brass or molded nylon.
3. Fine control needle valves shall be fully assembled and individually tested at 300 PSI helium pressure under water. Maximum working pressure shall be 200 PSI air pressure.
4. Where used for oxygen and other pure gases, valves shall be cleaned, lubricated, and packed to maintain purity of media.

S. Quick-Connect Fittings: NPT male inlet, NPT male outlet.

## 2.7 WATER FAUCETS AND VALVES

- A. Forged or cast brass valve body; provide units with renewable barrel locked in valve body. Barrel shall contain all wearing parts; with renewable discs; molded TFE stem packing; self-lubricating, high durometer, thermoplastic valve disc.

1. Metal-to-metal or ground type of sealing is not acceptable.

B. Provide Units That Are:

1. Readily converted from compression to self-closing (or the reverse) without disturbing faucet body.
2. Readily converted from water valve to needle valve or steam valve (or the reverse) with outside packing gland without disturbing faucet body.

C. Valve goes from closed to open in 120 deg rotation of handle; double-acme stem thread; forged brass four-arm handle.

D. Provide adjustable volume control to regulate flow of water through valve. Volume control can conserve water, compensate for high water pressure, and minimize splashing.

E. Vacuum Breakers: Provide vacuum breakers on all water fittings (hot and cold) including at fume hoods. Provide the following type:

1. Integral atmospheric vacuum breakers.

F. Handles: Provide handles as noted on Fixture Schedule.

## 2.8 DISTILLED, DEIONIZED, AND PURE WATER FIXTURES

A. Polypropylene Lined Brass Faucets and Fixtures:

1. Fabricated with a brass exterior and an interior lining of inert polypropylene. All components in contact with water shall be polypropylene.
2. Valves shall be manual or self-closing type (as indicated by fixture number), and shall have a round molded nylon handle, screw-on index disc and a removable serrated hose end.
3. Valves shall have a brass body, brass bonnet, and brass stem with floating tip.

## 2.9 REMOTE CONTROL VALVES (FOR FUME HOODS)

A. Mount remote control valves on the front panel of fume hood, with components subject to wear accessible from the exterior of the hood. Mount with valve stem parallel to side wall of the fume hood. The centerline of the valve inlet and outlet shall be parallel. Valves shall have a threaded collar to hold valve in place, and a forged brass body and forged brass four-arm handle with a full view color-coded type index disc.

1. Valves for gas, air, vacuum, and special gas service shall be needle type design either fine control or standard construction, as indicated in Fixture Schedule, with a self-centering replaceable stainless steel floating cone and replaceable stainless steel valve seat. Valves for water and steam service shall have a renewable flat valve disc and replaceable stainless steel seat.

B. For fittings inside fume hoods, coat with acid and solvent resistant baked on plastic OR epoxy coating in manufacturer's standard color as acceptable to Architect.

- A. If required, electrical service fittings are specified in Division 16.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Examine roughed-in mechanical and electrical services, installation of floors, walls, columns, and ceilings, and other conditions affecting installation of fittings and fixtures.
  - 1. Verify dimensions and locations of services and substrates before fabricating work.
- B. Notify Architect of unsatisfactory conditions preventing proper installation of fittings and fixtures.
  - 1. Do not proceed with fabrication and installation until unsatisfactory conditions have been corrected in manner satisfactory to Architect and Owner.
  - 2. Start of work shall indicate acceptability of related work.

#### 3.2 INSTALLATION

- A. Set each fitting and fixture securely in place, level, and adjust to correct height. Anchor to supporting substrate where indicated and where required for proper operation. Conceal anchorages where possible.

#### 3.3 FIELD QUALITY CONTROL

- A. Testing: Coordinate use of fittings and fixtures after service lines have been tested and balanced, and pressure, voltage, and similar requirements have been properly adjusted. Do not operate service lines until they have been cleaned and sanitized.
- B. Test each item to demonstrate that it is operating properly and that controls and safety devices are functioning. Repair or replace fittings or fixtures found to be defective in operation, including units that are operating below capacity or with excessive noise or vibration.

#### 3.4 CLEANING

- A. After testing remove protective coverings and clean equipment. Restore exposed and semi-exposed finishes; remove abrasions and other damage, polish bare metal surfaces and touch-up painted surfaces.
  - 1. Buff exposed stainless steel finishes lightly, using power buffer and polishing rouge or grit of No. 400 or finer.
  - 2. Touch-up minor abrasions and imperfections in painted finishes with coating which matches factory-applied finish.

- B. Clean and sanitize equipment, and repair or replace deteriorated or defective equipment to a condition free of damage and deterioration at time of Owner's final acceptance of the equipment.

### 3.5 DEMONSTRATION

- A. Provide services of manufacturer's technical representative where required, instruct personnel in operation and maintenance of laboratory equipment.
- B. Schedule training with Owner and provide minimum 7 day notice to Contractor and Architect.

END OF SECTION



## SECTION 11535

### LABORATORY ACCESSORIES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Drying racks.
2. Local exhaust vents (Snorkels).
3. Post-and-Shelf stainless steel wire shelving
4. Coat hooks.
5. Paper towel dispenser.
6. Gas cylinder restraints.
7. Gas cylinder storage racks.
8. Gas cylinder cabinets.
9. Diamond plate floor protection.
10. Firestop devices.

##### 1.2 REFERENCE STANDARDS

###### A. Comply with the requirements of the following codes and standards except as shown or specified otherwise

1. American Society for Testing and Materials (ASTM)
2. National Fire Protection Association (NFPA) Codes and Standards.
3. Underwriters Laboratories, Inc. (UL) Standards for Safety.
4. National Electric Manufacturers Association (NEMA), Standards Publication No. LD3.

##### 1.3 ACTION SUBMITTALS

- A. Product Data: Include specifications, technical data, standard details, and installation recommendations for each type of product required.
- B. Shop Drawings: Show in large scale, methods of construction, joining, dimensions, materials, thickness, finishes of materials, installation details including location of anchorage, fitting to adjoining work, required blocking, and other details required to fully illustrate the work.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver laboratory accessories in manufacturers unopened containers. Comply with manufacturer's instructions for storage and handling. Protect from moisture and damage.



## 1.5 PROJECT CONDITIONS

- A. Do not begin installation of laboratory accessories until the following conditions have been met:
1. Ceilings, overhead ductwork, and lighting are installed.
  2. Painting and flooring are complete.

## PART 2 - PRODUCTS

### 2.1 DRYING RACKS

- A. Basis-of-Design Product: Inter Dyne Systems "Victoria V Style." Provide named product or comparable product.
1. Size: As shown on Drawings.
- B. Material: Body of drying rack fabricated from 20-ga., Type 304 stainless steel with No. 4 finish; fabricate body as seamless single s-piece construction with hemmed edges, integral drip trough at bottom, and T-shaped holes in front to accommodate pegs.
1. Pegs: 1/2 inch diameter by 6 inches long, white; with T-shaped protrusion on base of peg to fit holes in drying rack, allowing convenient insertion and removal of peg.
  2. Drip Trough: Integral with pegboard, length same as rack width.
    - a. Screen: Stainless steel screen insert for drip trough.
    - b. Outlet: 3/8 inch o.d. stainless steel tube to drain drip trough
    - c. Drain Tube: 36 inch long PVC
  3. Wall Hanger: Integral with body of drying rack, allow for convenient removal and replacement of drying rack.

### 2.2 LOCAL EXHAUST VENTS (SNORKELS)

- A. Basis-of-Design Product: Nederman, Inc. "FX Arms - Standard No. 70502034". Provide named product or comparable product by the following:
1. Alsident Systems A/S.
  2. Movex, Inc.
- B. Local Exhaust Vent: Assembly of articulating arms that can be swiveled 360 degrees as well as adjusted in any direction to provide a concentrated method of fume extraction. Includes built-in damper to control air flow. Features include the following:
1. Mounting: Ceiling mounted; gypsum, acoustic, and exposed ceilings.
  2. Extraction Arms: Aluminum tubes with clear anodized finish.
  3. Joints: Polypropylene plastic, adjustable friction-held joints with 360 degree swivel.
  4. Hood: Clear PETG plastic dome; 13.8 inch diameter.
  5. Ceiling Column Bracket: For mounting local exhaust vent assembly to ceiling.

6. Ceiling Mounting Plate and Fasteners: Steel plate for attaching local vent assembly at ceiling, or structure above at exposed ceilings. Provide bracing as indicated on Lab Furniture Drawings.

## 2.3 POST AND SHELF STAINLESS STEEL WIRE SHELVING

- A. Basis-of-Design: InterMetro Industries Corporation “Super Erecta – Super Adjustable System”. Provide named product or comparable product by the following:
  1. Gillis Associated Industries “Stainless Steel Wire Shelving”
  2. Nexel “Stainless Steel Wire Shelving”.
- B. Open-Wire, Post-and-Shelf Metal Storage Shelving: Factory-formed, field-assembled, freestanding, open-wire, post-and-shelf metal storage shelving system; designed for shelves to span between and supported by corner posts, with shelves adjustable over the entire height of shelving unit. Fabricate initial shelving unit with a post at each corner. Fabricate additional shelving units similarly, so each unit is independent. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.
- C. Stainless Steel Tubing: ASTM A 554, Grade MT-304.
- D. Stainless Steel Wire: ASTM A 580/A 580M, Type 304.
- E. Posts: Fabricated from one-inch OD, square tubing; with grooves or notches at one inch o.c. to receive shelf-to-post connectors. Label posts with numbers at not less than 2 inches o.c. for determining shelf height.
  1. Post Material: Stainless Steel.
  2. Post Base: Bolt leveler.
  3. Post Cap: Nylon or plastic.
- F. Truss-Edge Wire Shelves: Stainless steel wire-over-wire construction; with down-turned wire truss edges; with manufacturer’s standard post collar, designed to engage collet (wedge), welded at each corner.
  1. Wire Pattern: One inch.
  2. Shelf Capacity: 400 pounds.
  3. Shelf Quantity: Five shelves per shelving unit in addition to top and bottom shelf.
  4. Shelf-to-Post Connectors: Manufacturer’s standard one-piece collet (wedge), designed to engage post collar attached to shelves.
  5. Overall Unit Size: As indicated on Drawings.
- G. Casters: Provide two locking and two swivel stainless steel stem casters with donut bumpers where indicated on Drawings
- H. Stainless Steel Finish: No. 4 satin.

## 2.4 COAT HOOKS

- A. Basis-of-Design Product: Bobrick “No. B-682”. Provide specified product or comparable product by the following:
  - 1. American Specialties, Inc.
  - 2. Bradley Corporation.
  
- B. Surface mounted coat hooks with concealed mounting.
  - 1. Material: Type 304 stainless steel.
  - 2. Finish: Satin.
  - 3. Projection: 3-1/16 inches from wall.

## 2.5 PAPER TOWEL DISPENSER

- A. Basis-of-Design Product: Bobrick “B-4262”. Provide specified product or comparable product by the following:
  - 1. American Specialties, Inc.
  - 2. Bradley Corporation.
  
- B. Towel Dispensing Unit: Surface mounted stainless steel unit designed to dispense not less than 400 singlefold paper towels; door with continuous piano hinge and tumbler lock.

## 2.6 GAS CYLINDER RESTRAINT

- A. Gas Cylinder Restraint: Metal angle support, and safety chain; safety chain shall be adjustable for cylinders up to 14 inches in diameter. Provide safety chains; attach to wall mounted Unistrut framing members as detailed.
  
- B. Paint Unistrut assembly in color selected by Architect.
  
- C. Basis-of-Design Product: First Safety Corporation; Model# G-275 and G-400. Provide specified product or comparable product by the following:
  - 1. Lab Safety Supply.
  - 2. Fisher Scientific.

## 2.7 GAS CYLINDER STORAGE RACKS

- A. Gas Cylinder Storage Racks: Structural tube design with 2 inch square steel tube continuously seam welded and sealed with exterior grade powder paint. Welded steel chains with snaps for each cylinder.
  - 1. Rack Configuration:
    - a. 4 cylinder tube style rack 2 cyl wide by 2 deep.
    - b. 8 cylinder rack 4 cyl wide by 2 deep.

B. Manufacturer: Subject to requirements, provide products by one of the following:

1. First Safety Corporation.
2. Lab Safety Supply.
3. Fisher Scientific.

## 2.8 GAS CYLINDER CABINETS

A. Basis-of-Design Product: Gas Safety Storage Cabinets; Series 7000.

1. Model 7100, one cylinder capacity.
2. Model 7400, four cylinder capacity.

B. Gas Cylinder Cabinets: 11-ga. cold-rolled steel cabinet, all welded construction, with inlet air louver and safety glass viewing window in door, and exhaust stack at top. Door features include neoprene gasketing, security lock, non-protruding paddle type door latch, and automatic door closure. Cabinet interior shall include sprinkler head, Unistrut channels for mounting gas control panels and cylinder supports, cylinder restraints, and low-profile reinforced threshold.

C. Provide cabinets with ultraviolet/infrared (UVIR) detector for connection to Building Fire Alarm System.

D. Provide exhaust connection with photohelic switch installed at outlet for air flow monitoring in control system.

## 2.9 DIAMOND PLATE FLOOR PROTECTION

A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

B. Thickness: 1/8 inch.

C. Size: As indicated.

## 2.10 FIRESTOP DEVICES

A. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

B. Basis-of-Design Product: 3M; EZ Path Series 33 Fire Rated Pathway. Provide specified product or comparable product by the following:

1. Hilti, Inc.
2. Specified Technologies, Inc.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Notify Architect, in writing, of unsatisfactory conditions preventing proper installation of laboratory accessories.
- B. Do not proceed with installation of laboratory accessories until unsatisfactory conditions have been corrected in an acceptable manner.

### 3.2 INSTALLATION

- A. Set each item of fixed equipment securely in-place, level, and adjust to correct height. Anchor to supporting substrate where indicated and where required for proper operation. Conceal anchorage where possible.

### 3.3 FIRESTOP DEVICES INSTALLATION

- A. Install in accordance with manufacturer's written installation instructions and UL-classified system for number of devices penetrating.

### 3.4 CLEANING AND PROTECTION

- A. Remove protective coverings and clean laboratory accessories, internally and externally. Restore exposed and semi-exposed finishes; remove abrasions and other damage, polish bare metal surfaces and touch-up painted surfaces.
  - 1. Touch-up minor abrasions and imperfections in exposed stainless steel finishes using power buffer and polishing rouge or grit No. 400 or finer.
  - 2. Touch-up minor abrasions and imperfections in painted finishes with coating which matches factory-applied finish.
- B. Clean laboratory accessories and repair or replace deteriorated or defective accessories to a condition free of damage and deterioration at time of Substantial Completion.

### 3.5 PROTECTION

- A. Protection: Protect installed laboratory accessories from damage by work of other trades until date of Substantial Completion.

### 3.6 DEMONSTRATION

- A. Provide services of manufacturer's technical representative where required, to instruct Owner's personnel in operation and maintenance of laboratory accessories.

- B. Schedule training with Owner and provide at least 7-day notice to Contractor and Architect of training date.

END OF SECTION

