SECTION 111200 - PARKING CONTROL EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Parking control equipment which meets the certification goals as established by the Victor Valley Community College District (VVCCD) Program for the individual Project requirements, of the following types.

B. Section Includes:

1. Pay stations.

C. Related Requirements:

1. Section 055000 "Metal Fabrications" for pipe bollards to protect parking control equipment.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for parking control equipment.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties.

B. Shop Drawings: For parking control equipment.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For parking control equipment to include in emergency, operation, and maintenance manuals.

B. Software and Firmware Operational Documentation:
   1. Software operating and upgrade manuals.
   2. Program Software Backup: On magnetic media or compact disk, complete w/ data files.
   3. Device address list.
   4. Printout of software application and graphic screens.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain parking control equipment from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

A. Parking Control System: For the following types of parking management:
   1. Flat-Rate Parking: Unlimited-duration parking, with free entry and fixed-fee amount paid at pay station.

B. Electrical Components and Devices: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 PAY STATIONS

A. General: Provide self-contained, cashiering central pay stations designed for self-service operation; consisting of magnetic-stripe ticket dispensers and readers/validators, digital displays or LEDs, fee computers, controllers and printers housed in a combined enclosure.

B. Physical Characteristics:
   1. Battery backup for clock and RAM memory.
2. Thermostatically controlled heater with on/off/auto switch.
3. Intercom.

C. Operational Characteristics:

1. Standalone.
2. Compute multiple parking fees based on entry times on ticket from ticket dispenser.
3. Compute multiple taxes by percent and fixed amount.
4. Programmable lost ticket function.
5. Display fee.
6. Accept payment by cash and credit card and debit card.
7. Compute change.
8. Print receipts on demand.
9. Print validation on ticket.
10. Print audit trail.
11. Programmable for up to six (6) fee structures.
12. Test mode to verify accuracy of fee structure program.
13. Programmable time.
15. Built-in service diagnostics.
16. Print cash audit, revenue, operational, and statistical reports on demand.
17. Duress alarm output for emergencies.

D. Cabinets: Fabricated from cold-rolled steel sheet with seams welded and ground smooth, approximately 36 inches wide by 18 inches deep by 60 inches tall (914 mm wide by 457 mm deep by 1524 mm tall). Provide single, gasketed access door with flush-mounted locks. Furnish two keys for each lock, all locks keyed alike. Fabricate cabinet with internal reinforcing and four mounting holes accessible only from inside cabinet.

1. Finish cabinet, interior and exterior, with manufacturer's standard yellow baked-enamel or powder coat finish.

2.4 ANCHORAGES

A. Anchor bolts; hot-dip galvanized according to ASTM A 153/A 153M and ASTM F 2329.

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT

A. Manage construction waste in accordance with provisions of Section 01 74 19 Construction Waste Management and Disposal. Submit documentation to satisfy the requirements of that Section.

1. Set aside scrap material to be returned to manufacturer for recycling into new product.
SECTION 113100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Residential Appliances which meets the certification goals as established by the Victor Valley Community College District (VVCCD) Program for the individual Project requirements, of the following types.

B. Section Includes:

1. Refrigeration appliances.
2. Cleaning appliances.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.

B. LEED Submittals:

1. Product Data for Credit EA 1.4 or Credit EA 9.1: For appliances indicated, documentation that products are ENERGY STAR rated.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of appliance, from manufacturer.

C. Field quality-control reports.

D. Warranties: Sample of special warranties.
1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. High-Altitude Conversion: Provide gas-operated appliances with manufacturer's conversion kit installed by a qualified service agency according to manufacturer's written instructions for Project location and type of fuel.

C. Regulatory Requirements: Comply with the following:
   1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. ANSI: Provide gas-burning appliances that comply with ANSI Z21 Series standards.


1.7 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period except as qualified below:
   1. Warranty Period: Five (5) years from date of Substantial Completion.

B. Refrigerator/Freezer, Sealed System: Full warranty including parts and labor for on-site service on the product.
   1. Warranty Period for Sealed Refrigeration System: Five (5) years from date of Substantial Completion.
   2. Warranty Period for Other Components: Five (5) years from date of Substantial Completion.

C. Clothes Washer: Full warranty including parts and labor for on-site service on the product.
   1. Warranty Period: Three (3) years from date of Substantial Completion.

D. Clothes Dryer: Full warranty including parts and labor for on-site service on the product.
   1. Warranty Period: Three (3) years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 REFRIGERATOR/FREEZERS

A. Refrigerator/Freezer Two-door refrigerator/freezer with freezer on bottom and complying with AHAM HRF-1.

2. Type: Freestanding
3. Dimensions:
   a. Width: As indicated on Drawings.
   b. Depth: As indicated on Drawings.
   c. Height: As indicated on Drawings.

4. Storage Capacity:
   a. Refrigeration Compartment Volume: 15.6 cu. ft. (0.44 cu. m).
   b. Freezer Volume: 5.13 cu. ft. (0.15 cu. m).
   c. Shelf Area: Three adjustable wire shelves, 26 sq. ft. (2.42 sq. m).

5. General Features:
   a. Door Configuration: Framed or Overlay.
   b. Dual refrigeration systems.
   c. Separate touch-pad temperature controls for each compartment.

6. Refrigerator Features:
   a. Interior light in refrigeration compartment.
   b. Compartment Storage: Vegetable crisper and meat compartment.
   c. Door Storage: Modular compartments.
   d. Temperature-controlled meat/deli bin.

7. Freezer Features: One freezer compartment with door configured as pull-out drawer.
   a. Automatic defrost.
   b. Interior light in freezer compartment.
   c. Automatic icemaker and storage bin.

8. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

9. Front Panel(s): Manufacturer's standard

10. Retain first subparagraph below if retaining porcelain-enamel or reversible panel(s) in last subparagraph above.
   a. Panel Color: As indicated or Stainless Steel.

2.2 REFRIGERATOR

A. Refrigerator/Freezer: Single Door and complying with AHAM HRF-1.

2. Type: Under Counter
3. Dimensions:
   a. Width: As indicated on Drawings.
   b. Depth: As indicated on Drawings.
   c. Height: As indicated on Drawings.

4. Storage Capacity:
   a. Refrigeration Compartment Volume: As indicated on Drawings
   b. Shelf Area: As indicated on drawings

5. General Features:
   a. Door Configuration: Framed or Overlay.
   b. Dual refrigeration systems.
   c. Separate touch-pad temperature controls for each compartment.

6. Refrigerator Features:
   a. Interior light in refrigeration compartment.

7. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

8. Front Panel(s): Manufacturer’s standard

9. Retain first subparagraph below if retaining porcelain-enamel or reversible panel(s) in last subparagraph above.
   a. Panel Color: As indicated on drawings.

10. Appliance Color/Finish: White, Black, Stainless steel.

2.3 CLOTHES WASHERS AND DRYERS

A. Clothes Washer: Complying with ASSE 1007, Commercial Grade with Commercial use capabilities.

1. Type: Freestanding, front-loading unit.
2. Dimensions:
   a. Width: As indicated on Drawings.
   b. Depth: As indicated on Drawings.
   c. Height: As indicated on Drawings.

a. Capacity: As indicated on Drawings

4. Controls: Touch-pad controls for water-fill levels, wash/rinse water temperatures, and variable-speed and fabric selectors.
   a. Wash Cycles: Minimum Six (6) wash cycles including regular, delicate, and permanent press.
   b. Wash Temperatures: Minimum Three (3) settings.
   c. Speed Combinations: Five.

5. Electrical Power: As indicated on Drawings.


7. Features: Retain first subparagraph below for top-loading machines only. See Evaluations.
   a. Self-cleaning lint filter.
   b. Unbalanced-load compensator.
   c. Inlet Hoses: Minimum length 60 inches (1525 mm).
   d. Drain Hoses: Minimum length 48 inches (1220 mm).
   e. Self-leveling legs.
   g. Spin-cycle safety switch.
   h. End-of-cycle signal.
   i. Extra-rinse option.
   j. Delay-wash option.
   k. Electronic temperature control.
   l. Water levels automatically set.

8. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

9. Appliance Finish: Porcelain enamel on top and lid; baked enamel on front and sides or Stainless steel.
   a. Color: White or Stainless Steel.

    a. Panel Color: White or Stainless Steel.

B. Clothes Dryer: Complying with AHAM HLD-1. Commercial Grade with Commercial use capabilities.

1. Type: Freestanding, frontloading, gas unit.

2. Dimensions:
   a. Width: As indicated on Drawings.
   b. Depth: As indicated on Drawings.
   c. Height: As indicated on Drawings.

a. Capacity: 7.0 cu. ft. (0.20 cu. m).
5. Gas-Dryer Power: 22,000-Btu/h (6400-W) gas.
6. Features:
   a. Removable lint filter.
   b. Electronic temperature and moisture level sensor control.
   c. End-of-cycle signal.
   d. Interior drum light.
   e. Self-leveling legs.
   f. Antibacterial cycle.
   g. Auxiliary drying rack.
   h. Built-in electrical power fuse.
   i. Pedestal: 15-inch- (381-mm-) high laundry pedestal with storage drawer, matching appliance finish.

7. Appliance Finish: Porcelain enamel on top and lid; baked enamel on front and sides Stainless steel.

2.4 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT

A. Manage construction waste in accordance with provisions of Section 01 74 19 Construction Waste Management and Disposal. Submit documentation to satisfy the requirements of that Section.
   1. Set aside scrap material to be returned to manufacturer for recycling into new product.
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Projection screens which meet the certification goals as established by the Victor Valley Community College District (VVCCD) Program for the individual Project requirements, of the following types.

B. Section Includes:
   1. Manually operated, front-projection screens.
   2. Electrically operated, front-projection screens and controls.

C. Related Requirements:
   1. Section 055000 "Metal Fabrications" for metal support framing for front-projection screens.

1.3 DEFINITIONS

A. Gain: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

B. Half-Gain Angle: The angle, measured from the axis of the screen surface to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show layouts and types of front-projection screens. Include the following:
   1. Drop lengths.
   2. Location of seams in viewing surfaces.
   3. Location of screen centerline relative to ends of screen case.
   4. Anchorage details, including connection to supporting structure for suspended units.
   5. Details of juncture of exposed surfaces with adjacent finishes.
   6. Location of wiring connections for electrically operated units.
7. Wiring diagrams for electrically operated units.
8. Accessories.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For front-projection screens to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Projection Screens: Obtain front-projection screens from single manufacturer. Obtain accessories, including necessary mounting hardware, from screen manufacturer.

2.2 ELECTRICALLY OPERATED, FRONT-PROJECTION SCREENS

A. General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Controls: Remote, key-operated, three-position control switch installed in recessed device box with flush cover plate matching other electrical device cover plates in room where switch is installed.
   a. Provide power supply for low-voltage systems if required.
   b. Provide locking cover plates for switches.
   c. Provide key-operated, power-supply switch.
   d. Provide infrared or radio-frequency remote control consisting of battery-powered transmitter and receiver.
   e. Provide video interface control for connecting to projector. Projector provides signal to raise or lower screen.

3. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.

4. End-Mounted Motor: Instant-reversing, gear-drive motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Locate motor in its own compartment on right end of screen unless otherwise indicated.
5. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch- (9.5-mm-) diameter metal rod with ends of rod protected by plastic caps.

6. Tab Tensioning: Provide units that have a durable low-stretch cord, such as braided polyester, on each side of screen that is connected to edge of screen by tabs to pull screen flat horizontally.

B. Suspended, Electrically Operated Screens with Automatic Ceiling Closure, with Motor-in-Roller, and without Tab Tensioning: Units designed and fabricated for suspended mounting; with bottom of case composed of two panels, fully enclosing screen, motor, and wiring; one panel hinged and designed to open and close automatically when screen is lowered and fully raised, the other removable or openable for access to interior of case.

C. Suspended, Electrically Operated Screens with Automatic Ceiling Closure, with End-Mounted Motor, and without Tab Tensioning: Units designed and fabricated for suspended mounting; with bottom of case composed of two panels, fully enclosing screen, motor, and wiring; one panel hinged and designed to open and close automatically when screen is lowered and fully raised, the other removable or openable for access to interior of case.

2.3 FRONT-PROJECTION SCREEN MATERIAL

A. Matte-White Viewing Surface: Peak gain of not less than 0.9, and gain of not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.

B. Matte-Gray Viewing Surface: Peak gain of not less than 0.8, and half-gain angle of not less than 50 degrees from the axis of the screen surface.

C. Glass-Beaded Viewing Surface: Peak gain of not less than 2.0, and half-gain angle of at least 15 degrees from the axis of the screen surface.

D. Matte Reflective Viewing Surface: Peak gain of not less than 1.3, and half-gain angle of at least 40 degrees from the axis of the screen surface.

E. Wide-Angle Reflective Viewing Surface: Peak gain of not less than 1.5, and half-gain angle of at least 35 degrees from the axis of the screen surface.

F. Multipurpose Reflective Viewing Surface: Peak gain of not less than 1.8, and half-gain angle of at least 25 degrees from the axis of the screen surface.

G. High-Gain Reflective Viewing Surface: Peak gain of not less than 2.4, and half-gain angle of at least 20 degrees from the axis of the screen surface.

H. Mildew-Resistance Rating: Zero or 1 when tested according to ASTM G 21.


J. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.
K. Seams: Where length of screen indicated exceeds maximum length produced without seams in material specified, provide screen with horizontal seam placed as follows:

L. Seamless Construction: Provide screens, in sizes indicated, without seams.

M. Edge Treatment: Black masking borders.

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE MATERIAL

A. Manage construction waste in accordance with provisions of Section 01 74 19 Construction Waste management and Disposal. Submit documentation to satisfy the requirements of that Section.

1. Set aside scrap material to be returned to manufacturer for recycling into new product.

END OF SECTION 115213
SECTION 115313 - LABORATORY FUME HOODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Laboratory Fume Hoods which meets the certification goals as established by the Victor Valley Community College District (VVCCD) Program for the individual Project requirements, of the following types.

B. Section Includes:

1. Piping and wiring within fume hoods for service fittings, light fixtures, fan switches, and other electrical devices included with fume hoods.
2. Fume hood base cabinets.
3. Work tops within fume hoods.
4. Laboratory sinks and cup sinks in fume hoods.
5. Water, laboratory gas, and electrical service fittings in fume hoods.

C. Related Requirements:

1.
2. Section 092216 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring fume hoods.
3. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for field quality-control testing of fume hoods.
4. Section 230900 "Instrumentation and Control for HVAC" for VAV controls for fume hood exhaust.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For laboratory fume hoods.

1. Include plans, elevations, sections, and attachment details.
2. 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.
3. Indicate locations and types of service fittings together with associated service supply connection required.
4. Indicate duct connections, electrical connections, and locations of access panels.
5. Include roughing-in information for mechanical, plumbing, and electrical connections.
6. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from the above items.
7. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
8. Include coordinated dimensions for laboratory equipment specified in other Sections.

C. Samples: For fume hood exterior finishes, epoxy sinks, and epoxy work tops.

D. Delegated-Design Submittal: For fume hoods indicated to comply with seismic performance requirements and design criteria.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Showing compliance with specified performance requirements for as-manufactured containment and static pressure loss, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency.

B. Source quality-control reports.

C. Field quality-control reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain laboratory fume hoods from single manufacturer.
   1. Obtain laboratory fume hoods from same source from same manufacturer as laboratory casework.

B. Product Designations: Drawings indicate sizes, types, and configurations of fume hoods by referencing designated manufacturer's catalog numbers. Other manufacturers' fume hoods of similar sizes, types, and configurations, and complying with the Specifications, may be considered. See Section 016000 "Product Requirements."

C. New hoods shall be equal to or be of better quality than the fume hoods in the existing Science Building for design, performance, and function.

2.2 PERFORMANCE REQUIREMENTS

A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110:

B. Static-Pressure Loss: Not more than 1/2-inch wg (124 Pa) at 100-fpm (0.51-m/s) face velocity with sash fully open when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.
C. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design fume hoods for seismic performance.

D. Seismic Performance: Fume hoods shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.3 FUME HOODS

A. Product Standards: Comply with SEFA 1, "Laboratory Fume Hoods - Recommended Practices." Provide fume hoods UL listed and labeled for compliance with UL 1805.


C. VAV 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.

D. Auxiliary Air: Where indicated, equip fume hoods with auxiliary-air outlet for connection to a system that supplies air from an external source equal to 70 percent of the exhausted air volume. Auxiliary-air system introduces air directly above and immediately in front of hood face. Capture efficiency of hoods shall be 90 percent minimum.

2.4 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.

C. Glass-Fiber-Reinforced Polyester: Polyester laminate with a chemical-resistant gel coat on exposed faces, and having a flame-spread index of 25 or less according to ASTM E 84.

D. Epoxy: Factory molded, modified epoxy-resin formulation with smooth, nonspecular finish.

E. Polypropylene: Unreinforced polypropylene complying with ASTM D 4101, Group 01, Class 1, Grade 2.

F. Glass: Clear, laminated tempered glass complying with ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality-Q3; with two plies not less than 3.0 mm thick and with clear, polyvinyl butyral interlayer.

G. Polycarbonate Glazing: Clear, uncoated polycarbonate sheet manufactured by extrusion process and complying with the following requirements:

H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
I. Fasteners: Provide stainless-steel fasteners where exposed to fumes.

2.5 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 (889-by-2007-mm) door opening.

B. Steel Exterior: Fabricate from steel sheet, 0.048 inch (1.21 mm) 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. Stainless-Steel Exterior: Fabricate from stainless-steel sheet, 0.050 inch (1.27 mm) 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.

D. Fiberglass Exterior: Fabricate from glass-fiber-reinforced polyester components not less than 1/4 inch (6.35 mm) thick, bonded together to maximum extent practical. Trim edges of panels with PVC extrusion. Limit removable parts to access panels, front fascia, and airfoil.

E. Polypropylene Exterior: Fabricate from fully stress-relieved polypropylene sheet, 1/2 inch (12.7 mm) thick, with welded seams. Access panels shall be 1/4 inch (6.35 mm) thick, flush mounted, and fastened with flat-head polypropylene screws.

F. Product Option: Provide either steel or fiberglass exterior as specified above.

G. 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.

H. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.

I. Interior Lining: Provide interior lining.

J. 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.

K. Molded Glass-Fiber-Reinforced Polyester Lining: Molded unit consisting of end panels, back panel, preset rear baffle, and top bonded together into a single piece; reinforced to form a rigid assembly to which exterior is attached.

L. 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.
M. Rear Baffle: Unless otherwise indicated, provide baffle, of same material as fume hood lining, at rear of hood with openings at top and bottom. Secure baffle to cleats at rear of hood with stainless-steel screws. Fabricate baffle for easy removal for cleaning behind baffle.

N. 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.

O. Bypass Grilles: Provide grilles at bypass openings of fume hoods.

P. Sashes: Provide operable sashes of type indicated.

Q. Airfoil: Unless otherwise indicated, provide airfoil at bottom of fume hood face opening with 1-inch (25-mm) space between airfoil and work top. Sash closes on top of airfoil, leaving 1-inch (25-mm) opening for air intake. Airfoil directs airflow across work top to remove heavier-than-air gases and to prevent reverse airflow.

R. 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- (6.35-mm-) 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.

S. 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.

T. 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 hood.

U. Ceiling Extensions: Provide filler panels matching fume hood exterior to enclose space above fume hoods at front and sides of fume hoods and extending from tops of fume hoods to ceiling.

V. Finished Back Panels: Where rear surfaces of fume hoods are exposed to view, provide finished back panels matching rest of fume hood enclosure.

W. 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.

2.6 FUME HOOD WORK TOPS AND SINKS

A. Work Tops: Epoxy.

B. Cup Sinks: Epoxy 3-by-6-inch (75-by-150-mm) oval, 3-by-9-inch (75-by-228-mm) oval, 5-inch (127-mm) diameter.

C. Work Surface of Floor-Mounted Fume Hoods: Integral floor with 1/2-inch- (13-mm-) high, raised (marine) edge.
D. Structural Performance of Radioisotope Fume Hood Components: Capable of withstanding the loads without permanent deformation, excessive deflection, or binding of cabinet drawers and doors.

2.7 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 (0.05 mm).

2.8 ACCESSORIES

A. Airflow Indicator and Alarm: Provide each fume hood with manufacturer's standard airflow indicator with audible and visual alarm that activates when airflow sensor reading is outside of preset range.

B. Airflow Indicator: Provide each fume hood with airflow indicator.

C. Airflow Alarm: Provide fume hoods with audible and visual alarm that activates when airflow sensor reading is outside of preset range.

D. Sash Alarm: Provide fume hoods with audible and visual alarm that activates when sash is opened beyond preset position.

E. Sash Stops: Provide fume hoods with sash stops to limit hood opening to 50 percent of sash height. Sash stops can be manually released to open sash fully for cleaning fume hood and for placing large apparatus within fume hood.

F. Bypass Grille Blank-off Panel: Provide fume hoods with blank-off panel on bypass grille designed for use with sash stops to reduce exhaust air volume and provide design face velocity with sash at 50 percent open position.
PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT

A. Manage construction waste in accordance with provisions of Section 01 74 19 Construction Waste Management and Disposal. Submit documentation to satisfy the requirements of that Section.
   1. Set aside scrap material to be returned to manufacturer for recycling into new product.

END OF SECTION 115313