

SECTION 12 35 53
LABORATORY CASEWORK

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI):
 - a. A135.4, Basic Hardboard.
 - b. A208.1, Particleboard, Mat-Formed Wood.
 - c. Z358.1, Emergency Eyewash and Shower Equipment.
2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE): 110, Method of Testing Performance of Laboratory Fume Hoods.
3. APA–The Engineered Wood Association (APA): Grades and Specifications.
4. Architectural Barriers Act (ABA).
5. Architectural Woodwork Institute, Architectural Woodwork Manufacturers Association of Canada, Woodwork Institute (AWI, AWMAC, WI): Architectural Woodwork Standards.
6. ASTM International (ASTM):
 - a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - b. A507, Standard Specification for Drawing Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled.
 - c. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - d. C1048, Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
 - e. D1193, Standard Test for Reagent Water.
 - f. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
7. National Electrical Manufacturer’s Association (NEMA):
 - a. LD 3, High Pressure Decorative Laminates (HPDL).
 - b. WD 1, General Color Requirements for Wiring Devices.
8. National Institute of Standards and Technology (NIST), Product Standard Section: PS 1, Structural Plywood.
9. National Fire Codes–National Fire Protection Association (NFPA):
 - a. 30, Flammable and Combustible Liquids.
 - b. 45, Fire Protection for Laboratories Using Chemicals.
10. Occupational Safety and Health Administration (OSHA): General Industry Standards, Section 1910.106.

11. Scientific Equipment and Furniture Association (SEFA):
 - a. SEFA 1, Recommended Practices For Laboratory Fume Hoods.
 - b. SEFA 2, Recommended Practices For Installations.
 - c. SEFA 8, Recommended Practices For Laboratory Grade Casework.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Completely describe and illustrate design features, materials, fabrication, and casework layout including rough-in details for plumbing, electrical, and ventilation connections.
 - a. Key units to Contract Document designations.
 - b. Provide details and dimensions not controlled by job conditions.
 - c. Show required field measurements beyond manufacturer's control.
 - d. Establish and maintain applicable rough-in and field dimensions.
 - e. Descriptive literature and manufacturer's specifications of casework, hardware, service fixtures, and specialty items.
 - f. Brochures, catalogs, installation instructions, and operations and maintenance manuals.
 - g. Clearly mark with Contract Document designation each proposed item in manufacturer's literature.
 - h. Coordinate Shop Drawings with other trades.
 - i. Anchorage and bracing drawings and/or catalog information, as required by Section 01 88 15, Anchorage and Bracing, for loads provided in General Structural Notes as shown.
2. Samples:
 - a. Finished color Samples of each finish proposed by casework manufacturer.
 - b. Sample unit, complete with hardware including locks, accessories, and top for Contracting Officer's inspection and 1 month's use. Unit, except top, may be used on Project.

B. Informational Submittals:

1. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing, for loads provided in General Structural Notes as shown. Submit with Action Submittal for the same item.
2. Fume hood performance test results.
3. Qualifications of manufacturer and installation lead person.

1.03 QUALITY ASSURANCE

A. Standards:

1. Casework: Conform to AWI, AWMAC, and WI Architectural Woodwork Standards, Section 10, Premium grade, including laboratory features.
2. Fume Hoods: Conform with testing method of ASHRAE 110 and resulting instantaneous and average performance rating of 8 AM 0.1 (controls or limits loss of containment to less than 0.1 part per million “as manufactured” at release rate of 8 liters of sulfur hexafluoride per minute over the testing period) with face velocity of 100 fpm.

B. Casework Manufacturer Qualifications:

1. Reputation for doing satisfactory work on time.
2. Successful completion of comparable work.
3. Specialization in design and manufacture of plastic laminate casework or furnishings for scientific laboratories.
4. Operation of adequate size factory devoted to manufacture of plastic laminate laboratory casework or furnishings.
5. Minimum 5 years’ experience in manufacture of quality and type of laboratory casework and furnishings specified.

C. Installation Services: Install under direct supervision of factory-trained representative of casework manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver materials to Project Site until excessive moisture is out of building for at least 10 days.
- B. Store casework inside in dry and well-ventilated areas, and do not subject to extreme changes in temperature or humidity.
- C. Coordinate delivery and installation with Contracting Officer. Contracting Officer may wish to inspect items in Contractor’s presence to verify condition.

PART 2 PRODUCTS

2.01 CASEWORK MANUFACTURERS

- A. Plastic laminate faced casework of the following manufacturers, meeting these Specifications, may be used on this Project:
 1. TMI Systems, Dickinson, ND.
 2. Or equal.

2.02 CASEWORK MATERIALS

A. Wood Products-General:

1. Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
2. Sustainable Material Requirements:
 - a. Certified Wood: Provide products with a minimum certified wood content of 60 percent.
 - b. Formaldehyde emissions-free, no volatile organic compound (VOC), synthetic resins.

B. Medium Density Fiberboard (MDF):

1. Physical Characteristics:
 - a. Thickness: Minimum 3/4 inch.
2. Functional Characteristics: None.
3. Performance Characteristics:
 - a. Minimum Average Density: 45 pounds to 50 pounds per cubic foot.
 - b. ANSI A208.2, Grade 130 or better.

C. Composition Board:

1. Physical Characteristics:
 - a. Particleboard or monolithic flakeboard.
 - b. Three-ply board of balanced construction.
 - c. Thickness: Minimum 3/4 inch.
 - d. Made with waterproof glue.
2. Functional Characteristics: None.
3. Performance Characteristics:
 - a. Density: Minimum 45 pounds per cubic foot.
 - b. Moisture Content: Maximum 10 percent.
 - c. ANSI A208.1, Grade M 2.

D. Plywood: APA exterior type conforming to NIST, Product Standard Section, PS 1.

1. Physical Characteristics:
 - a. Thickness: Minimum 3/4 inch.
2. Functional Characteristics: None.
3. Performance Characteristics:
 - a. Grade: No knots or voids present on surfaces. Use marine grade for cabinet bases.

E. Hardboard:

1. Physical Characteristics:
 - a. Wood fibers and resin binder molded under high pressure.
 - b. Thickness: Minimum 1/4 inch.
 - c. Premium grade.
2. Functional Characteristics: None.
3. Performance Characteristics:
 - a. Tensile Strength: 3,500 psi.
 - b. Shear Strength: 4,500 psi.
 - c. ANSI A135.4, Type II, Surface 2, Finish A, Design A.

F. Chemical-Resistant Plastic Laminate:

1. Manufacturers and Products:
 - a. Wilsonart; Chemsurf.
 - b. Or equal.
2. Physical Characteristics:
 - a. High-pressure plastic laminate (HPDL) for cabinet surfaces, excluding countertops.
 - b. Thickness: 0.034 inch plus or minus 0.005 inch.
 - c. Color: As shown in Interior Finish Schedule as shown on the Drawings.
3. Functional Characteristics: None.
4. Performance Characteristics:
 - a. NEMA LD 3, Grade HGP 30 with Grade CLS 20 backing.
 - b. Chemical Resistance for 16-Hour Contact Period:
 - 1) No effect for dilute acids, solvents, bases, indicators, biological stains, and general reagents.
 - 2) Only slight change of gloss or color for 48 percent hydrofluoric acid, chromic acid, 85 percent phenol, and 78 percent calcium thiocyanate.
 - 3) Only slight damage for 70 percent nitric acid and 96 percent sulfuric acid.

G. Edge Banding:

1. Physical Characteristics:
 - a. Minimum 3-mm thick polyvinyl chloride.
 - b. Color: Black.
2. Functional Characteristics: None.
3. Performance Characteristics: None.

H. Seismic Edges, Shelves:

1. Manufacturers:
 - a. Plexiglas Optical.
 - b. Or equal.
2. Physical Characteristics:
 - a. Material: Scratch resistant acrylic.
 - b. Attached with counter sunk stainless steel screws.
 - c. Thickness: 3 mm.
 - d. Height: 1 inch above top of each shelf.
3. Functional Characteristics: None.
4. Performance Characteristics:
 - a. Tensile Strength: 67.5 MPa.
 - b. Light Transmission: 92 percent.
 - c. Micro-Scratch Resistance: Class 1.

I. Hardware: Provide hardware of type, quality, size, and quantity appropriate to the specific application. Provide Type 304 stainless steel or other nonferrous metal. Verify metals in contact with one another are compatible and will avoid galvanic corrosion when exposed to moisture.

J. Hinges:

1. Manufacturers and Products:
 - a. Hardware Resources; HR0076SS.
 - b. Or equal.
2. Physical Characteristics: Minimum five-knuckle, hospital tip fixed pin type, four screws each leaf into faces; no edge fastening permitted.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

K. Wire Pulls:

1. Manufacturers and Products:
 - a. Hardware Resources; K271-Pull.
 - b. Or equal.
2. Physical Characteristics: Approximately 4 inches center-to-center between supports, maximum 5/16-inch diameter, stainless steel.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

L. Shelf Fasteners:

1. Manufacturers and Products:
 - a. Hardware Resources; 1710.
 - b. Or equal.

2. Physical Characteristics:
 - a. Metal providing rigid and true shelf alignment.
 - b. Stainless steel or dull chrome finish.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

M. Drawer Slides:

1. Manufacturers:
 - a. Hardware Resources.
 - b. Or equal.
2. Physical Characteristics:
 - a. Full extension slide.
 - b. Metal designed to mate with drawer slides in cabinets.
3. Functional Characteristics: Provide smooth sliding action and soft close.
4. Performance Characteristics:
 - a. Load Support on Extended Drawer: 200 pounds in file drawers, 75 pounds in drawers 6 inches and less in depth, and 150 pounds at drawers wider than 24 inches and 100 pounds in other drawers.

N. Accessories: Manufacturer's standard catches, grommets, and other accessories and trim required to complete installation in secure and rigid manner. Finish to match other exposed hardware.

O. Transparent Doors:

1. Physical Characteristics:
 - a. Clear tempered float glass.
 - b. 1/4-inch (6-mm) minimum thickness.
2. Functional Characteristics: Condition A, Type I, Class 1 glazing quality.
3. Performance Characteristics: Conforming to ASTM C1048.

P. Track for Transparent Doors:

1. Manufacturers:
 - a. C.R. Laurence Co, Inc.
 - b. Or equal.
2. Physical Characteristics:
 - a. Anodized aluminum double channel.
 - b. Track with nylon roller.
3. Functional Characteristics: Provide smooth sliding for glass doors.
4. Performance Characteristics: None.

Q. Pulls for Transparent Doors:

1. Manufacturers and Products:
 - a. C.R. Laurence Co, Inc.; FP88.
 - b. Or equal.
2. Physical Characteristics:
 - a. Clear plastic finger pull with adhesive backing.
 - b. Minimum of 3/4 inch wide by 2-3/4 inches long.
 - c. Maximum thickness of 1/8 inch to allow passing of glass doors.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

R. Adhesives:

1. Physical Characteristics: Manufacturer's standard water-resistant adhesives.
2. Functional Characteristics: None.
3. Performance Characteristics: Volatile Organic Compound (VOC) content limit of 80 grams/liter in accordance with South Coast Air Quality Management District Rule 1168.

S. Sealant:

1. Physical Characteristics:
 - a. General: As specified in Section 07 92 00, Joint Sealants.
2. Functional Characteristics: None.
3. Performance Characteristics: Volatile Organic Compound (VOC) content limit of 250 grams/liter in accordance with South Coast Air Quality Management District Rule 1168.

T. Countertops:

1. Manufacturers and Products:
 - a. Durcon; Durcon Resin.
 - b. Or equal.
2. Physical Characteristics:
 - a. Molded, modified, solid epoxy resin.
 - b. Formulated to produce smooth, nonabsorbent, chemical, heat, and shock-resistant surface.
 - c. Homogeneous in color and texture.
 - d. Thickness: Minimum 1 inch.
 - e. Drip groove under front edge.
 - f. Integral two-piece glued backsplash for full length of adjoining walls.
 - g. Color: As shown in Interior Finish Schedule as shown on the Drawings.
3. Functional Characteristics: None.

4. Performance Characteristics:
 - a. Physical properties; minimum acceptable physical performance in accordance with SEFA 3 testing procedures:
 - 1) Density/Specific Gravity: Tested to ASTM D792; minimum test rating of 133.6 pounds per cubic foot or 2.14 grams per cubic centimeter.
 - 2) Rockwell Hardness: Tested to ASTM D785; minimum M scale rating of 109.
 - 3) Fire Resistance: Tested to ASTM D635; classified as self-extinguishing.
 - 4) Surface Burning Characteristics: Tested to ASTM E84; flame spread index 5 and smoke developed index of 185.
 - 5) Coefficient of Linear Thermal Expansion: Tested to ASTM D696; rating of 1.2 by 10-5 in/in°F or 2.15 by 10-5 mm/mm°C.
 - 6) Heat Deflection: Tested to ASTM D648; maximum 293 degrees F or 145 degrees C.
 - 7) Flexural Strength: Tested to ASTM D790; minimum rating 12.6 kpsi or 87 Mpa.
 - 8) Flexural Modulus: Tested to ASTM D790; 3,240 kpsi or 22.4 Gpa.
 - 9) Water absorption, 24 hours: tested to ASTM D570; maximum 0.03 percent by weight.
 - 10) Compression Strength: Tested to ASTM D695; minimum 32.7 kpsi or 226 Mpa.
 - 11) Chemical resistance; minimum acceptable chemical resistance performance in accordance with SEFA 3:
 - a) Amyl Acetate, Method A, Rating 1.
 - b) Ethyl Acetate, Method A, Rating 1.
 - c) Acetic Acid, 98 percent, Method B, Rating 0.
 - d) Acetone, Method A, Rating 1.
 - e) Acid Dichromate, 5 percent, Method B, Rating 0.
 - f) Butyl Alcohol, Method A, Rating 1.
 - g) Ethyl Alcohol, Method A, Rating 1.
 - h) Methyl Alcohol, Method A, Rating 0.
 - i) Ammonium Hydroxide, 28 percent, Method B, Rating 1.
 - j) Benzene, Method A, Rating 1.
 - k) Carbon Tetrachloride, Method A, Rating 1.
 - l) Chloroform, Method A, Rating 1.
 - m) Chromic Acid, 60 percent, Method B, Rating 3.
 - n) Cresol, Method A, Rating 1.
 - o) Dichloroacetic Acid, Method A, Rating 1.
 - p) Dimethyl formamide, Method A, Rating 1.
 - q) Dioxane, Method A, Rating 1.
 - r) Ethyl Ether, Method A, Rating 0.

- s) Formaldehyde, 37 percent, Method A, Rating 0.
- t) Formic Acid, 90 percent, Method B, Rating 1.
- u) Furfural, Method A, Rating 1.
- v) Gasoline, Method A, Rating 0.
- w) Hydrochloric Acid, 37 percent, Method B, Rating 1.
- x) Hydrofluoric Acid, 48 percent, Method B, Rating 2.
- y) Hydrogen Peroxide, 30 percent, Method B, Rating 0.
- z) Tincture of Iodine, Method B, Rating 0.
- aa) Methyl Ethyl Ketone, Method A, Rating 0.
- bb) Methylene Chloride, Method A, Rating 1.
- cc) Monochlorobenzene, Method A, Rating 1.
- dd) Naphthalene, Method A, Rating 0.
- ee) Nitric Acid, 20 percent, Method B, Rating 0.
- ff) Nitric Acid, 30 percent, Method B, Rating 1.
- gg) Nitric Acid, 70 percent, Method B, Rating 1.
- hh) Phenol, 90 percent, Method A, Rating 1.
- ii) Phosphoric Acid, 85 percent, Method B, Rating 0.
- jj) Silver Nitrate, Saturated, Method B, Rating 1.
- kk) Sodium Hydroxide, 10 percent, Method B, Rating 1.
- ll) Sodium Hydroxide, 20 percent, Method B, Rating 1.
- mm) Sodium Hydroxide, 40 percent, Method B, Rating 1.
- nn) Sodium Hydroxide, Flake, Method B, Rating 0.
- oo) Sodium Sulfide, Saturated, Method B, Rating 1.
- pp) Sulfuric Acid, 33 percent, Method B, Rating 0.
- qq) Sulfuric Acid, 77 percent, Method B, Rating 1.
- rr) Sulfuric Acid, 96 percent, Method B, Rating 3.
- ss) Sulfuric Acid, 77 percent and Nitric Acid, 70 percent, equal parts, Method B, Rating 1.
- tt) Toluene, Method A, Rating 1.
- uu) Trichloroethylene, Method A, Rating 1.
- vv) Xylene, Method A, Rating 1.
- ww) Zinc Chloride, Saturated, Method B, Rating 0.

U. Backsplashes, Backsplash Returns, Splash Curbs (SCB), Reagent Shelves, and Reagent Shelf Supports: Same material as adjacent countertop.

V. Drain Racks (DRK): Polypropylene pegs on epoxy resin countertop material in sizes as shown and Drain Rack Detail.

2.03 FUME HOOD FHD-1

A. Manufacturers and Products:

- 1. Labconco; Model No. 110810002.
- 2. Or equal.

B. Physical Characteristics:

1. 8-foot automatic bypass air type fume hood.
2. Size: 96 inches long by 37.7 inches deep by 59 inches high exterior dimensions.
3. No part of foil or superstructure to extend more than 3-1/4 inches beyond edge of countertop into aisle space.
4. Fire- and chemical-resistant finish inside and out.
5. Construction: Flame-resistant molded fiberglass reinforced polyester resin interior and steel exterior.
6. Matching U.S. Standard 18-gauge, ASTM A507, mild steel closure panels (CPL) to close openings to within 1 inch above installed fume hood.
7. Matching U.S. Standard 18-gauge, ASTM A507, mild steel filler panels (FPL) to close openings between fume hood and wall.
8. Fixed, nonadjustable baffle.
9. Removable front and side panels, and front access panels, for access to plumbing and electrical connections.
10. Exhaust Duct Connection: 12.8-inch inside diameter.
11. Color: Selected by Contracting Officer from manufacturer's standard colors.

C. Functional Characteristics:

1. Two remote service fixtures indexed and located as shown.
2. Two ground fault circuit interrupt (GFCI) electrical duplex receptacle(s) located as shown.
3. Two postless, pulldown, safety glass sashes.
4. Epoxy resin dish molded countertop surface to contain spills.
5. Cup Sinks: Locate as shown with panel vacuum breaker cold water fixture with serrated nozzle end discharging into cup sink.
6. Base cabinet fume vent (BCV) for fumes from base cabinet.
7. Base Cabinets: provide base cabinets capable of supporting minimum of 800 pounds as shown for the following needs.
 - a. Acid Storage Base cabinet provided by same manufacturer as fume hood and designed to be integrated with fume hood model. Polyethylene-lined interior and polyethylene liner tray for corrosion-resistance.
 - b. Flammable Storage Base cabinet provided by same manufacturer as fume hood and designed to be integrated with fume hood model. Self-closing and self-latching and flame arrestors in rear vents.
8. Operation Mode: Conventional automatic bypass with bypass air varying with sash height.
9. Switch to operate blower flush mounted on the face rail as shown.

10. High efficiency, instant start T8 fluorescent lighting located outside hood interior and sealed behind 1/4-inch thick safety glass vapor proof assembly with external access.
11. 120 Volt, 20 Amp: Connect light, light switch, receptacles, and FVM in accordance with local codes.

D. Performance Characteristics:

1. Face Velocity: Design for 80 fpm with sash full open (1,280 cfm at 0.19-inch water column external static pressure) from remotely located motor/blower.
2. Electronic sensor, digital face velocity monitor (FVM) with audible and visible alarm for low flow conditions, and external alarm functions, flush mounted on face rail as shown.

2.04 CANOPY HOOD CHD-1

A. Manufacturers:

1. Labconco.
2. Or equal.

B. Physical Characteristics:

1. U.S. Standard 18-gauge ASTM A666, Type 316 stainless steel.
2. Fabricate in length and width as shown, according to Canopy Hood Detail.
3. Matching removable steel closure panels (CPL) to close openings above installed canopy hood.
4. Matching side panels to close the openings between the bottom of the canopy hood and the benchtop.
5. Continuous drip gutters with condensate drain to nipple for 1/4-inch inside diameter plastic tubing to cup sink.
6. Interior baffle with single slot around bottom periphery for 100 fpm minimum slot face velocity from remotely located motor/blower.
7. Fluorescent Light Fixtures (FLT):
 - a. Solid metal front with prismatic lay in diffuser.
 - b. Exterior Dimensions: 33-1/2 inches long by 5 inches wide by 1-1/8 inches deep.
 - c. Mount on baffle bottom.
 - d. Lamps: One 8 watt and one 13 watt T5 tube each FLT.
 - e. 120-volt, fixture-mounted rocker FLT switch.
 - f. Finish and Color: White enamel.
8. Chemical-resistant (epoxy coat) finish inside and outside.
9. Color: Selected by Contracting Officer from manufacturer's standard colors.

- C. Functional Characteristics: None.
- D. Performance Characteristics: None.

2.05 LABORATORY EPOXY RESIN SINK LSK-1

- A. Manufacturers and Products:
 - 1. Durcon; Model No. D30.
 - 2. Or equal.
- B. Physical Characteristics:
 - 1. Double Compartment: One-piece, molded epoxy resin with coved corners and corner outlet and drain board.
 - 2. Size: Each bowl 18 inches long by 15 inches wide by 11 inches deep interior dimensions.
 - 3. Epoxy resin sink drain, outlet complete with removable strainer, stopper, and 1-1/2-inch tailpiece.
- C. Functional Characteristics: None.
- D. Performance Characteristics: None.

2.06 LABORATORY CUP SINK LSK-2

- A. Manufacturers and Products:
 - 1. Durcon; Model No. CS4R.
 - 2. Or equal.
- B. Physical Characteristics:
 - 1. Molded Epoxy or Modified Resin: Oval shape.
 - 2. Size: 6 inches long by 3 inches wide by 4-1/2 inches deep inside dimensions.
 - 3. 1-1/2-inch tailpiece with removable strainer.
 - 4. Flush mounted in epoxy resin countertop.
- C. Functional Characteristics: None.
- D. Performance Characteristics: None.

2.07 LABORATORY SERVICE FIXTURES

- A. General: Protect chrome plumbing service fixtures with manufacturer's standard epoxy enamel coating applied by manufacturer's electrostatic powder coating process.
- B. Air Gap LP-1:
 - 1. Manufacturers and Products:
 - a. Delta; Model No. 72020.
 - b. Or equal.
 - 2. Physical Characteristics:
 - a. Drain air gap for glassware washer, flask washer, or dishwasher.
 - b. Plastic extension and inner cap with chrome-plated outer cap.
 - c. Supply locknut, washers, and installation hoses and clamps.
 - 3. Functional Characteristics: None.
 - 4. Performance Characteristics: None.
- C. Deck-Mounted Gooseneck Faucet LP-2:
 - 1. Manufacturers and Products:
 - a. WaterSaver Faucet Co.; Model No. L412VB.
 - b. Or equal.
 - 2. Physical Characteristics:
 - a. Swing gooseneck with 6-inch spread, vacuum breaker, and removable aerator.
 - b. Paddle handles.
 - 3. Functional Characteristics: Index for hot and cold water.
 - 4. Performance Characteristics: None.
- D. Deck-Mounted Mixing Faucet LP-3:
 - 1. Manufacturers and Products:
 - a. WaterSaver Faucet Co.; Model No. L611VB.
 - b. Or equal.
 - 2. Physical Characteristics:
 - a. Rigid gooseneck, vacuum breaker, and removable serrated nozzle.
 - b. Faucet handle position(s) as shown.
 - c. Index for cold water.
 - 3. Functional Characteristics: None.
 - 4. Performance Characteristics: None.
- E. Single Pedestal Vacuum Valve LP-5:
 - 1. Manufacturers and Products:
 - a. WaterSaver Faucet Co.; Model No. L2880 131WSA.
 - b. Or equal.

2. Physical Characteristics:
 - a. Stainless steel needle point valve rated 125 psi maximum.
 - b. Supply nipple and locknut.
 - c. Index for vacuum.
 3. Functional Characteristics: None.
 4. Performance Characteristics: None.
- F. Multioutlet Assembly, Ground Fault Circuit Interrupter (GFCI) Protected LE-1:
1. Manufacturers and Products:
 - a. Legrand; Plugmold 2000.
 - b. Or equal.
 2. Physical Characteristics:
 - a. Two-circuit with adjacent outlets on alternated circuits.
 - b. Three-wire grounding receptacles configured NEMA WD 1 Type 5 20R on 9-inch centers.
 - c. Five Wire: Two-phase conductors, two neutrals, and one common ground.
 - d. Size: 1-9/32 inches wide by 3/4 inch deep by lengths as shown.
 - e. Finish and Color of Raceway and Alternate Receptacles: Selected by Contracting Officer from manufacturer's standard colors.
 3. Functional Characteristics: None.
 4. Performance Characteristics: None.

2.08 FURNISHINGS AND EQUIPMENT

- A. Fire Blanket, FBT:
1. Manufacturers and Products:
 - a. Grainger; Model 39P028.
 - b. Or equal.
 2. Physical Characteristics:
 - a. Fire blanket in quick release pouch with wall mounting capability.
 - b. Blanket must be heat and chemical resistant.
 - c. Blanket must be at least 60 inches wide by 72 inches long.
 - d. Color: High visibility.
 3. Functional Characteristics: None.
 4. Performance Characteristics: None.
- B. Lab Fire Extinguisher: See Section 10 44 00, Fire Protection Specialties and Safety Equipment.

C. Paper Towel Dispenser, PTD-2:

1. Manufacturers and Products:
 - a. Bradley; Model No. 250-15.
 - b. Or equal.
2. Physical Characteristics:
 - a. Surface-mounted, 22-gauge, Type 304 (18-8) stainless steel unit with refill indicator slot.
 - b. Size: Approximately 15 inches high by 11 inches wide by 4 inches deep exterior dimensions.
 - c. Tumbler lock and hinged opening.
 - d. Finish: Satin.
3. Functional Characteristics:
 - a. Capacity: 400 C-fold towels.
4. Performance Characteristics: None.

D. Refrigerator/Freezer, Laboratory, RFR:

1. Manufacturers and Products:
 - a. Fisher Products; Model No. 13-986-151B.
 - b. Or equal.
2. Physical Characteristics:
 - a. Upright model with single door.
 - b. Size: 29 inches wide by 65 inches high by 30 inches deep exterior dimensions.
 - c. Door Swing: Right opening (left hinge).
 - d. Three adjustable shelves.
 - e. White enamel exterior.
 - f. 120 volt.
3. Functional Characteristics:
 - a. Capacity: Minimum 12.6 cubic feet.
 - b. Designed to comply with NFPA and OSHA for laboratory storage.
4. Performance Characteristics: None.

E. Refrigerator, Undercounter, URF:

1. Manufacturers and Products:
 - a. Fisher Products; Model No. FBV05RPSA.
 - b. Or equal.
2. Physical Characteristics:
 - a. Undercounter model with single door.
 - b. Size: 23.63 inches wide by 33.5 inches high by 23.5 inches deep exterior dimensions.
 - c. Door Swing: Right opening (left hinge).
 - d. Three adjustable shelves.

- e. White enamel exterior.
 - f. 120 volt.
 - 3. Functional Characteristics:
 - a. Capacity: Minimum 5.5 cubic feet.
 - b. Designed to comply with NFPA and OSHA for laboratory storage.
 - 4. Performance Characteristics: None.
- F. Refrigerator, Pass-through, RPT:
- 1. Manufacturers and Products:
 - a. True; GDM-05PT-HC.
 - b. Or equal.
 - 2. Physical Characteristics:
 - a. Upright model with two swinging doors in pass through configuration.
 - b. Size: 24 inches wide by 36-1/2 inches high by 25 inches deep exterior dimensions.
 - c. Door Swing: As shown.
 - d. 120-volt.
 - 3. Functional Characteristics:
 - a. Top mounted compressor.
 - b. Two adjustable shelves.
 - 4. Performance Characteristics: None.
- G. Spill Kit, SKT:
- 1. Manufacturers and Products:
 - a. Fisher Scientific; Model No. 17-987-144A.
 - b. Or equal.
 - 2. Physical Characteristics:
 - a. Wall-mounted, multi-agent, spill control kit for acids, caustics, and solvents.
 - b. Size: 24 inches high by 18 inches wide by 6 inches deep exterior dimensions.
 - c. Separate shaker bottles for each agent, guides for spill response and treatment, safety goggles, rubber gloves, disposal bags, scraper, pick-up pans, and pH test papers.
 - d. Color: Bright green.
 - 3. Functional Characteristics: None.
 - 4. Performance Characteristics: None.

H. Ice Machine, IMN:

1. Manufacturers and Products:
 - a. Scotsman; Model No. B322S.
 - b. Or equal.
2. Physical Characteristics:
 - a. Produces flaked ice at a rate of 450 pounds in 24 hours at operating temperatures of 70 degrees F, air, and 50 degrees F, water, or 343 pounds in 24 hours at operating temperatures of 90 degrees F, air, and 70 degrees F, water using an air cooled condenser.
 - b. Dimension: 22 inches wide by 34 inches deep by 44 inches high.
 - c. Modular metallic ice bin with a capacity of 370 pounds of ice.
 - d. 120-volt, 15-amp.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

I. Lab Dishwasher, FWR:

1. Manufacturers and Products:
 - a. Labconco; Model No. 411001000.
 - b. Or equal.
2. Physical Characteristics:
 - a. Under-counter unit with stainless steel exterior specifically designed for laboratory flasks up to 2,000 mL capacity.
 - b. Size: 24 inches by 27.7 inches deep by 32 inches high exterior dimensions.
 - c. Stainless steel door with four leveling feet.
 - d. Dispensers: Detergent and rinse solution.
 - e. Stainless steel constructed interior.
 - f. Stainless steel spindle rack using 34 detachable spindles, two sizes of spindle clips, multi-pin insert, and two sizes of glassware holders.
 - g. Steam generator, purified water pump, and vacuum drying manifold.
 - h. Standard multi-pin insert and 4-inch and 6-inch glassware holder (two each).
 - i. Accessories: Adjustable height top rack with two hub adapters, extra multi-pin insert, 14 pipet insert, extra 4-inch and 6-inch glassware holders, and utensil basket with retainer top.
 - j. 1-1/2-inch vent trap and drain air gap located at adjacent sink.
 - k. 3/8-inch IPS inlet fitting for hot water tap connection providing minimum 1-1/4 gallons per minute flow.

- l. 3/4-inch ID flex hose connection for lab water system external storage for purified water providing minimum 1-1/2 gallons per minute flow.
 - m. 120 volt, 16 amp.
 3. Functional Characteristics:
 - a. Control panel with five factory preset and two user set microprocessor programs covering wash, steam, standard, rinse, purified water rinse, and dry cycles.
 - b. Safety lock, cancel, and drain functions.
 4. Performance Characteristics:
 - a. 20 degrees F above inlet temperature washing cycles with two approximate 700-watt booster heaters.
 - b. Room temperature purified water rinse cycles (deionized or reverse osmosis).
- J. White Board, WBD: See Section 10 80 00, Miscellaneous Specialties.
- K. Drain Rack, DRK:
1. Manufacturers and Products:
 - a. Durcon; Model No. 2424.
 - b. Or equal.
 2. Physical Characteristics:
 - a. Glassware drain rack constructed of cold, heat, moisture and impact resistant pegs and backboard, 1-inch thick epoxy resin backboard.
 - b. Dimensions as shown.
 - c. Backboard color to match countertops.
 3. Functional Characteristics:
 - a. Complete with 6-inch and 8-inch long replaceable, double studded, white polyethylene pegs, suitable for holding a variety of glassware.
 - b. Complete with stainless steel drip trough.
 4. Performance Characteristics: None.

2.09 CASEWORK FABRICATION

- A. Construct casework of plywood or composition board core, at manufacturer's option, covered with laminated plastic sheets on both surfaces.
- B. Furnish manufacturer's standard modular units conforming as closely as possible to dimensions and configurations as shown, or specially made casework units where standard sized units do not conform to dimensions and configurations as shown.
- C. Construct casework with face screwed fasteners. Do not depend on mechanical fastening, gluing, or screwing of core edges for strength.

- D. Excluding countertops, fabricate cabinet surfaces (fronts, backs, sides, tops, bottoms, shelves, doors, drawer fronts, bases, and fillers) with minimum 3/4-inch-thick plywood or composition board covered with chemical-resistant plastic laminate on both sides bonded by polyester resin at high pressure and temperature. Seal and protect cabinet and drawer surfaces from water intrusion.
- E. Radius exposed corners at least 1/4 inch.
- F. Protect edges from water intrusion including edges not exposed to view, e.g. resting on base, sitting on floor, standing behind cabinet. Install vinyl edges on exposed edges of cabinets, doors, and drawers. Locate joints in vinyl edges where least noticeable. Bond under pressure with waterproof hot melt glue and finish with smooth, radiused edges, and corners.
- G. Cabinet Bases:
 - 1. Design and construct separately from side and back panels to support cabinets rigidly in true alignment.
 - 2. Material: Marine grade exterior plywood.
 - 3. Height: 4 inches.
 - 4. Install adjustable leveling feet at each corner and at intermediate points necessary for rigid support.
- H. Countertops: Self-edged type.
- I. Backsplashes and Splash Curbs: Field glued.
- J. Cabinet Fronts: Flush design with no projecting edges.
- K. Access Panels: Removable units opening to pipe space behind cases at knee spaces, balance tables, ends of islands and peninsulas, and elsewhere for access.
- L. Sliding Glass Doors: Frameless type in wall-mounted or double-sided island or peninsula-mounted cases. Framed type for tall storage cabinets and base cabinets.
- M. Label Holders: Each drawer and door.
- N. Cabinet Locks, CLK: Each drawer and door.
- O. Color: Countertops, fronts, trim, and other exposed surfaces as selected by Contracting Officer from manufacturer's standard colors.

- P. Seismic Edges: Accessible sides of open shelves including reagent, wall, and pass-through units located above countertop height and on adjustable shelves only of closed, sliding glass door units at any height.
- Q. Wood Drawers: Construct in accordance with AWI, AWMAC, WI Architectural Woodwork Standards Premium grade including laboratory features.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION

- A. Make field measurements of items or conditions affecting casework, equipment, and furnishings.
- B. Examine grounds and supports of casework to assure adequate anchorage, free of foreign material, moisture, and unevenness that would prevent quality casework installation.
- C. Verify that ventilation outlets, service connections, and supports are correct and in proper location.
- D. Identify and correct defects before proceeding with installation.

3.02 INSTALLATION

- A. Use proper type of anchoring devices for materials encountered. Accurately place anchor bolts using templates furnished by equipment manufacturer and as specified in Section 05 50 00, Metal Fabrications.
- B. Install in accordance with manufacturer's instructions.
- C. Except where noted, install in new and ready-to-use condition.
- D. Cut, fit, patch, and provide support where required for proper and complete installation.
- E. Casework:
 - 1. Secure casework in place in true alignment, level, and plumb. Secure casework units to cleats anchored to building structure or wall framing. Install wall-hung cabinets to firmly and rigidly support cabinet weight plus normally expected cabinet content weight.
 - 2. Fasten together adjoining cabinets in an assembly joined at top and bottom of front and back with bolts placed inconspicuously inside cabinets.
 - 3. Close exposed-to-view openings larger than joints with filler of same material and finish as adjacent casework. Secure filler to casework with

concealed screws. Use minimum width and number of fillers consistent with need. Except as shown, do not use filler panels (FPL) exceeding 6-inch width.

4. Install cabinet front face 3 inches in front of cabinet base face to provide toe space.
5. Anchor shelf fasteners with screws when seismic edges used. Position shelves as directed by Contracting Officer.

F. Countertops:

1. Install standing height countertop's working surface 37 inches above finished floor. Install desk height countertop's working surface 31 inches above finished floor.
2. Install ABA accessible countertop's working surface 36 inches above finished floor.
3. Install level to within 1/16 inch in 10 feet and in largest possible increments.
4. Where not supported by base cabinets or other furnishings, use brackets or other support on minimum 3-foot centers.
5. Make joints with manufacturer-provided cement containing same color and chemical-resistance characteristics as top material. Leave joints smooth and in same plane as top.

G. Laboratory Sinks and Service Fixtures:

1. Install in countertops and cases in manner recommended by manufacturer.
2. Take care to avoid scratches and other damage to cases and countertops.
3. Install ready for connection of services.

H. Furnishings:

1. Provide equipment with connection terminals for plumbing, gas, steam, electrical, ventilation, and refrigeration service connections where required.
2. Where items are supplied without line cords, furnish line cord and plug compatible with electrical service and available outlets.

3.03 EXISTING EQUIPMENT

- A. Disconnect, move, and install ready for utility connection.
- B. Clean items for reuse to as close to original condition as acceptable to Contracting Officer.
- C. Remove existing items from Project Site for repairs or alterations; handle carefully and return.

3.04 FUME HOOD TESTING

- A. Test installed fume hoods for flow visualization, both local and large-volume challenges, and face velocity in conformance with test methods of current ASHRAE 110 and resulting instantaneous and average performance rating of 4 AI 0.1 (controls or limits loss of containment to less than 0.1 part per million “as installed” at release rate of 4 liters of sulfur hexafluoride per minute over the testing period) with face velocity of 100 fpm.
- B. Conduct testing after HVAC balancing as required by Section 23 05 93, Testing, Adjusting, and Balancing for HVAC, has been completed.
- C. Replace fume hood for failure to meet flow visualization challenges, to maintain average face velocity within 80 fpm plus or minus 15 fpm, or to attain individual face velocity readings within plus or minus 10 fpm of the average.

3.05 ADJUSTING AND CLEANING

- A. Adjust hardware and leave in smooth, easy condition. Remove protective maskings. Clean surfaces ready for use. Restore stained or discolored finishes or replace item.
- B. Inspect, adjust, clean, and test service fixtures to assure intended operation.

END OF SECTION

