

SECTION 12 34 50

LABORATORY CASEWORK AND FURNISHINGS

03/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- ANSI A135.4 (1995) Basic Hardboard
- ANSI A208.1 (1999) Particleboard Mat Formed Woods
- ANSI Z358.1 (1998) Emergency Eyewash and Shower Equipment

WOODWORK INSTITUTE (WI)

- WI Standards and Guide Specifications

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

- APA Grades and Specifications

ASTM INTERNATIONAL (ASTM)

- ASTM C 1048 (2004) Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- ASTM E 84 (2007b) Standard Test Method for Surface Burning Characteristics of Building Materials

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

- PS 1 Construction and Industrial Plywood

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings; G, AE

Drawings showing each type of cabinet and related item. The drawings shall clearly indicate the complete plan and elevations of the cabinets, equipment, and accessories and pertinent details of construction, fabrication, and attachments. Include rough-in details for plumbing, electrical, and ventilation connections.

Key units to Contract Document designations.

Provide details and dimensions not controlled by job conditions.

Show required field measurements beyond manufacturer's control.

Establish and maintain applicable rough-in and field dimensions.

SD-03 Product Data

Casework and furnishings; G, AE

Manufacturer's printed data, catalog cuts, and instructions for installation and cleaning.

Manufacturer's specifications and operations and maintenance manuals.

Clearly mark with Contract Document designation each proposed item in manufacturer's literature.

SD-04 Samples

Casework and furnishings; G, AE

Finished color samples of each finish proposed by casework manufacturer.

Sample unit complete with hardware, including locks and accessories, and top for inspection and 1 month's use. Unit, except top, may be used on Project.

1.3 QUALITY ASSURANCE

1.3.1 Standards

1.3.1.1 Casework

Conform to "Quality Standards" of Woodwork Institute (WI) Manual of Millwork Laboratory Grade.

1.3.2 Casework Manufacturer Qualifications

- a. Reputation for doing satisfactory work on time.
- b. Successful completion of comparable work.
- c. Specialization in design and manufacture of plastic laminate casework or furnishings for scientific laboratories.

- d. Operation of adequate size factory devoted to manufacture of plastic laminate laboratory casework or furnishings.
- e. Exclusion of brokers and unauthorized representatives.
- f. Minimum 5 years' experience in manufacture of quality and type of laboratory **casework and furnishings** specified.

1.3.3 Installation Services

Install under direct supervision of factory-trained representative of casework manufacturer.

1.4 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. Handle casework carefully to prevent damage to surfaces. Replace damaged items that cannot be restored to like-new condition.
- d. Coordinate delivery and installation with Engineer. Owner may wish to inspect items in Contractor's presence to verify condition.

PART 2 PRODUCTS

2.1 CASEWORK

Schedule casework in **approved detail drawings**. Fabricate casework in accordance with sizes shown on drawing elevations and details and conform to the requirements specified below.

2.2 CASEWORK MATERIALS

2.2.1 Composition Board

- a. Particle board or monolithic flakeboard.
- b. Three-ply board of balanced construction.
- c. Thickness: Minimum **3/4-inch**.
- d. Density: Minimum **45 pounds** per cubic foot.
- e. Moisture Content: Maximum **10 percent**.
- f. Made with waterproof glue.
- g. Moisture resistant.
- h. **ANSI A208.1-79**, Grade M-3.

2.2.2 Plywood

- a. **APA** exterior type conforming to NIST, Product Standard Section,

PS 1.

- b. Thickness: Minimum 3/4-inch.
- c. Grade: No knots or voids present on surfaces. Use marine grade for cabinet sub-bases.

2.2.3 Hardboard

- a. Wood fibers and resin binder molded under high pressure.
- b. Thickness: Minimum 1/4-inch.
- c. Premium grade.
- d. Tensile Strength: 3,500 psi.
- e. Shear Strength: 4,500 psi.
- f. ANSI A135.4, Type II, Surface 2, Finish A, Design A.

2.2.4 Chemical-Resistant Plastic Laminate

- a. High pressure plastic laminate for cabinet surfaces, excluding counter tops. Melamine does not qualify.
- b. Thickness: 0.036-inch plus or minus 0.005-inch.
- c. NEMA LD 3, Grade PF 30 with Grade CL 20 backing.
- d. 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.
- e. Color: As scheduled in the Color List on the Drawings.
- f. Interior Color: White.

2.2.5 Edge Banding

- a. Minimum 3 mm thick polyvinyl chloride (PVC).
- b. Color: As scheduled in the Color Schedule on the Drawings.

2.2.6 Seismic Edges

- a. PVC formed with edge banding.
- b. Thickness: 3 mm.
- c. Height: 1 inch above top of each shelf.

2.2.7 Hardware

2.2.7.1 Hinges

Minimum five-knuckle, hospital tip fixed pin type, dull chrome finish, four screws each leaf into faces. No edge fastening allowed.

2.2.7.2 Pulls

Manufacturer's standard semi-flush type of molded ABS plastic in color black.

2.2.7.3 Shelf Fasteners

Metal or plastic design providing rigid and true shelf alignment.

- a. If metal, provide dull chrome finish.
- b. If plastic, match cabinet interior color.

2.1.5.4 Drawer Slides

- a. Metal designed to mate with drawer slides in cabinets.
- b. Provide smooth sliding action with steel ball bearings.
- c. Load Support on Full-extension Drawer: 200 pounds in file drawers, 75 pounds in drawers 6 inches and less in depth, and 100 pounds in other drawers.

2.2.8 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.

2.2.9 Transparent Doors

Clear tempered float glass, conforming to ASTM C 1048, Kind FT, Condition A, Type I, Class 1, glazing quality, 1/4-inch (6 mm) minimum thickness.

2.2.10 Adhesives

Manufacturer's standard water-resistant adhesives.

2.2.11 Counter Tops

2.2.11.1 Epoxy Resin

- 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: Black.

2.2.12 Backsplashes, Backsplash Returns, Splash Curbs (SCB), Reagent Shelves, and Reagent Shelf Supports

Same material as adjacent counter top.

2.2.13 Drain Racks (DRK)

Polypropylene pegs on epoxy resin counter top material in sizes shown on Drawings and Drain Rack Detail.

2.3 LABORATORY EPOXY RESIN SINK (LSK-1)

2.3.1 Description

- a. Single Compartment: One-piece, molded epoxy resin with coved corners and corner outlet.
- b. Size: 21-1/2 inches long by 15-1/2 inches wide by 11 inches deep interior dimensions.
- c. Epoxy resin sink drain outlet complete with removable strainer, stopper, and 1-1/2-inch tailpiece.
- d. Style: Drop-in flush mount with lip set in recessed opening in counter top.

2.4 LABORATORY EPOXY RESIN SAMPLE SINK (LSK-2)

2.4.1 Description

- a. Single Compartment: One-piece, molded epoxy resin with coved corners and corner outlet.
- b. Size: 25 inches long by 15 inches wide by 13.7 inches deep interior dimensions.
- c. Style: Drop-in flush mount with lip set in recessed opening in counter top.
- d. Removable stainless steel splash screen SPLSN covering entire sink bottom.
- e. Epoxy resin sink drain outlet, complete with removable strainer, stopper, and 1-1/2-inch tailpiece.

2.5 LABORATORY CUP SINK (LSK-3)

2.5.1 Description

- a. Molded Epoxy or Modified Resin: Oval shape.
- b. Size: 6 inches long by 3 inches wide by 4-1/2 inches deep inside

dimensions.

- c. 1-1/2-inch tailpiece with removable strainer.
- d. Flush mount in epoxy resin counter top.

2.6 EYE WASH (EWH)

2.6.1 Description

- a. Barrier free, space saving, recessed flush-to-wall, mounted unit.
- b. Size: 15-inches wide by 34-inches high by 4-inches deep exterior dimensions.
- c. ADA compliant.
- d. Corrosion-resisting stainless steel cabinet.
- e. Pull-down ABS drainage pan activates water flow.
- f. Stay-open valve, closed by return of pan to upright position.
- g. Supply stop, integral trap, and union connection.
- h. Supply: 1/2-inch inlet for back or side connection.
- i. Waste: 1-1/2-inch outlet for back or side connection.
- j. Alarm: In-line flow switch in tempered water supply downstream of thermostatic mixing valve.
- k. Universal emergency sign.

2.7 SAFETY SHOWER (SSR)

2.7.1 Description

- a. Ceiling mounted unit with 10-inch diameter deluge showerhead.
- b. Corrosion-resisting stainless steel including exposed to view piping.
- c. Stay-open ball valve with rigid pull down to open, push up to close, triangular handle pull rod actuator.
- d. Nipple and fitting and two escutcheons.
- e. Line size service valve upstream of unit's valve.
- f. Supply: 1-inch.
- g. Configure and mount in accordance with ANSI Z358.1-90 with showerhead bottom installed 84 to 96 inches above floor.
- h. Alarm: In-line flow switch in tempered water supply downstream of thermostatic mixing valve (common with EWH-2).
- i. Universal emergency sign.

2.7.2 Safety Shower Tester Description

- a. Portable stainless steel support ring to encircle safety shower head.
- b. Funnel shaped, heavy-duty, waterproof fabric to drain water column to drain or test drum.

2.8 LABORATORY SERVICE FIXTURES

2.8.1 General

Protect chrome plumbing service fixtures with white epoxy enamel coating applied by manufacturer's electrostatic powder coating process.

2.8.2 Deck Mounted Mixing Faucet (LP-1)

- a. Swing gooseneck with 6-inch spread, vacuum breaker, and removable aerator.
- b. Index for hot and cold water.

2.8.3 Deck Mounted Gooseneck Faucet (LP-2)

- a. Rigid gooseneck, vacuum breaker, and removable serrated nozzle.
- b. Faucet handle position(s) as shown on Drawings.
- c. Index for cold water.

2.8.4 Deck Mounted Sample Water Faucet (LP-3)

- a. PVC single-ledge, rigid gooseneck with removable serrated nozzle.
- b. Four arm handle with manual and self-closing control.
- c. Under-counter line size service valve upstream of unit's valve.
- d. Index for sample source water.

2.8.5 Air Gap (LP-4)

- a. Drain air gap for flask washer.
- b. Plastic extension and inner cap with chrome-plated outer cap.
- c. Supply locknut, washers, and installation hoses and clamps.

2.8.6 Multi-outlet Assembly, Ground Fault Circuit Interrupter (GFCI) Protected (LE-1)

- a. Two-circuit with adjacent outlets on alternated circuits.
- b. Three-wire grounding in-line duplex receptacles configured NEMA 5-20R on 12-inch centers.
- c. Five-Wire: Two-phase conductors, two neutrals, and one common ground.

- d. Size: 1-29/32 inches wide by 7/8 inch deep by length in locations shown on Drawings.
- e. Supply: Pre-wired or electrician wire in field per manufacturer's quantity limits.
- f. GFCI Protection: Panel board.
- g. Finish: Aluminum satin anodized.

2.9 FURNISHINGS AND EQUIPMENT

2.9.1 Adjustable Chair/Stool (ACS)

- a. Five legs.
- b. Upholstered seat adjustable from 16 to 23 inches.
- c. Ball bearing casters.
- d. Articulating seat and backrest control.

2.9.2 First Aid Kit (FAK)

- a. Size: 10-1/2 inches wide by 10-1/2 inches high by 2-3/8 inches deep exterior dimensions.
- b. Metal cabinet with provisions for wall mounting.

2.9.3 Flask Washer (FWR)

- a. Under-counter unit with stainless steel exterior specifically designed for laboratory flasks up to 2000-ml capacity.
- b. Size: 24 inches wide by 26.4 inches deep by 34.3 inches high exterior dimensions.
- c. Stainless steel door with 4 leveling feet.
- d. Safety glass viewing window with interior light.
- e. Dispensers: Detergent and rinse solution.
- f. Control panel with five factory preset and two user set microprocessor programs covering wash, steam, standard rinse, purified water rinse, and dry cycles.
- g. 20 degrees F above inlet temperature washing cycles with two approximate 700-watt booster heaters.
- h. Room temperature purified water rinse cycles (deionized or reverse osmosis).
- i. Stainless steel spindle rack using 34 detachable spindles, two sizes of spindle clips, multi-pin insert, and two sizes of glassware holders.
- j. Safety lock, cancel, and drain functions.

- k. Stainless steel constructed interior.
- l. Steam generator, purified water pump, and vacuum drying manifold.
- m. Standard multi-pin insert and 4-inch and 6-inch glassware holder (2 each).
- n. Accessories: Adjustable height top rack with 2 hub adapters, extra multi-pin insert, eight pipet insert, 14 pipet insert, extra 4-inch and 6-inch glassware holders, and utensil basket with retainer top.
- o. 1-1/2-inch vent trap and drain air gap located at adjacent sink.
- p. 3/8-inch IPS inlet fitting for hot water tap connection providing minimum 1-1/4 gallons per minute flow.
- q. 3/4-inch ID flex hose connection for purified water providing minimum 1-1/2 gallons per minute flow.
- r. 120-volt, 16-amp.

2.9.4 Lab Fire Extinguisher (LFE)

- a. Size: 6 inches Diameter by 17 inches high by 9 inches wide exterior dimensions.
- b. Type and Fire Class: Non-toxic dry chemical to coat burning surface, smothering Class A, B, and C fires and inhibiting re-flash.
- c. Capacity: 10 pounds.
- d. Effective Range: 15 to 21 feet.
- e. Weight: 19 pounds fully charged.
- f. Bracket for wall mounting.

2.9.5 Lab Water System, Reverse Osmosis (R/O) and Storage Tank System LWS-R/O and LWS-Tank

- a. Wall mounted, fully automatic system consisting of 6 liter per hour R/O system and matching 30 liter storage tank connected by tubing for feed, distribution, and drainage..
- b. Size:
 - (1) R/O: 12 inches wide by 18 inches high by 18 inches deep exterior dimensions.
 - (2) Tank: 21 inches wide by 18 inches high by 15 inches deep exterior dimensions.
- c. Automatic mixing valve to maintain R/O feed water at 25 plus or minus 2 degrees C.
- d. 5 micron prefilter, membrane protection system (MPS) cartridge to

eliminate feed water softening, extruded carbon filter, and thin-film R/O membrane.

- e. Automatic flushing to eliminate scale build-up.
- f. System pressure gages for operating pressure and drops across pretreatment filters.
- g. Control panel monitoring operation, membrane performance, pressure, tank level, and other parameters for fully automatic operation.
- h. Fluorinated polyethylene 30-liter storage tank:
 - (1) Automatic operation with R/O and deionizer.
 - (2) Communicate with water level indicator on R/O.
 - (3) Draw off: Spigot, flask washer port, deionizer feed.
 - (4) Vent protection from airborne contaminants.
 - (5) Low water pump protector for deionizer feed.
- i. Wall mounting brackets.
- j. Replacement R/O membrane, MPS, carbon and 5 micron prefilter.
- k. 120 volt, 60 Hz, 8 amp.
- l. Manufacturer and Product: Barnstead; Model No. D12671/D7427/D12681.

2.9.6 Laboratory Point-of-Use Deionized Water System (LWS-DI)

- a. Wall mounted, pressure cartridges (3), analytical grade water system.
- b. Size: 12 inches wide by 18 inches deep by 18 inches high exterior dimensions.
- c. Less than 1 liter per minute flow for less than 15 liters per day usage.
- d. Tank stored feed water from R/O system.
- e. ASTM Type I water output at greater than 16 megohm cm resistivity.
- f. Standby mode recirculating water 10 minutes per hour to maintain optimum purity.
- g. 1 18 megohm cm resistivity digital purity meter.
- h. Silent operation pump.
- i. Accessory, non-contaminating, remote dispenser and bracket with 0.2 micron filter and tube umbilical allowing dispensing up to 8 foot (2,400 mm) distances and recirculation to maintain purity up to the tip.

- j. Primary and Replacement: Type I cartridge set for R/O feed water, 0.2 micron final filter.
- k. 120 volt.

2.9.7 Paper Towel Dispenser (PTD)

- a. Surface mounted, 22 gauge Type 304 (18-8) stainless steel unit with refill indicator slot.
- b. Capacity: 400 C-fold towels.
- c. Size: Approximately 15 inches high by 11 inches wide by 4 inches deep exterior dimensions.
- d. Tumbler lock and hinged opening.
- e. Finish: Satin.

2.9.8 Refrigerator/Freezer (RFR/F)

- a. Upright model with double doors.
- b. Capacity: Minimum 12.6-cubic foot total and 3.1-cubic foot freezer.
- c. Size: 28 inches wide by 66 inches high by 30 inches deep exterior dimensions.
- d. Door Swing: Right opening (left hinge) as shown on Drawings.
- e. Designed to comply with NFPA and OSHA for flammable storage.
- f. Three adjustable shelves.
- g. White enamel exterior.
- h. 120-volt, 420-watt.

2.9.9 Safety Eyewear Holder (SEH)

- a. Hold safety eyewear (glasses or goggles).
- b. Capacity: 8 pairs of safety spectacles.
- c. Size: 6 inches deep by 9 inches wide by 6 inches high exterior dimensions.
- d. Clear acrylic construction.

2.9.10 Spill Kit (SKT)

- 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.

2.9.11 Wall Clock Atomic (WCK)

a. Wall-mounted model with brushed aluminum frame.

b. Size: 12-inch.

c. Analog with black numerals, hour, and sweep second hand on white dial.

d. Accuracy: One second per million years.

e. Four time zone settings, daylight savings on/off option, with manual reset.

f. Automatic Operation:

(1) Sets to US Atomic Clock.

(2) Adjusts for daylight savings time.

g. Battery: One "AA" alkaline type.

2.9.12 Waste Receptacle (WRL)

a. Surface mounted, open top, Type 304 (18-8) 22-gauge stainless steel with removable, leak-proof waste container insert.

b. Waste Capacity: 6.8 gallon.

c. Size: 18 inches high by 14 inches wide by 6 inches deep exterior dimensions.

d. Finish: Satin.

2.9.13 Writing Board (WBD)

a. Materials: Stretcher level sheet steel facing, 28-gauge minimum; plywood, particle board, or hardboard backing; anodized extruded aluminum frame and tray.

b. Composition: Face sheet bonderized and surfaced to accept watercolor and semi-permanent writing inks with selective erasability; Class 1 Fire Hazard Classification with flame spread of 25 or less when tested in accordance with ASTM E 84; bonded to plywood, hardboard, or particle board backing.

c. Finish and Color: White porcelain enamel semi-gloss writing surface finish impervious to cracking, checking, chipping, and peeling. Extruded aluminum frame and tray clear anodize finish.

d. Size: 3 feet by 2.5 feet.

e. Accessories: Twelve watercolor markers, six black and six assorted colors compatible with writing surface; cleaners, towels, magnetic strips, and instruction booklet.

2.10 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 shown on Drawings or specially made casework units where standard sized units do not conform to dimensions and configurations shown on Drawings.
- c. Construct casework with face screwed fasteners. Do not depend on mechanical fastening, gluing, or screwing of core edges for strength.
- d. Excluding counter tops, fabricate cabinet surfaces (fronts, backs, sides, tops, bottoms, shelves, doors, drawer fronts, bases, and fillers) with minimum 3/4-inch thick composition board or plywood 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. Do not use melamine
- 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 and unexposed 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: APA Marine grade exterior plywood.
 - (3) Height: 4 inches.
 - (4) Shim or install adjustable leveling feet at each corner and at intermediate points necessary for rigid support.
- h. Counter Tops: 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, service fixture base cabinets 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 in tall storage cabinets and base cabinets.

- l. Color: Counter tops, fronts, trim, and other exposed surfaces as scheduled in the Drawings.
- m. Seismic Edges: Accessible sides of open shelves including reagent, wall, and pass-through units located above counter top height and on adjustable shelves only of closed, sliding glass door units at any height.
- n. Wood Drawers: Construct in accordance with WI Standard for Laboratory Grade.

PART 3 EXECUTION

3.1 INSPECTION AND PREPARATION

- a. Make field measurements examine grounds and supports of casework to assure adequate anchorage, free of foreign material, moisture, and unevenness that would prevent quality casework installation.
- b. Verify ventilation outlets, service connections, and supports correct and in proper location.
- c. Identify and correct defects before proceeding with installation.

3.2 INSTALLATION

- a. Use proper type of anchoring devices for materials encountered.
- 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 with toggle bolts. 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 where shown on the Drawings, do not use filler 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 Owner.

f. Counter Tops:

- (1) Install standing height counter top's working surface 37 inches above finished floor. Install desk height counter top's working surface 31 inches above finished floor.
- (2) Install level to within 1/16 inch in 10 feet and in largest possible increments.
- (3) Where not supported by base cabinets or other furnishings, use brackets or other support on minimum 3-foot centers.
- (4) Support drop-in or under-mount sinks.
- (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.
- (6) Protect surface from damage following installation. Do not work on unprotected surface or use as a workbench.

g. Laboratory Sinks and Service Fixtures:

- (1) Install in counter tops and cases in manner recommended by manufacturer.
- (2) Take care to avoid scratches and other damage to cases and counter tops.
- (3) Install ready for connection of services.
- (4) Coordinate cutouts for stainless steel drop-in sinks with manufacturer's recommendations.

h. Furnishings

- (1) Provide equipment with connection terminals for plumbing, gas, steam, electrical, ventilation, and refrigeration service connections.
- (2) Where items supplied without connection materials (e.g. piping, tubing, conduit, venting, cable, etc), furnish with connection materials compatible with connection points.
- (3) Where items supplied without line cords, furnish line cord and plug compatible with electrical service and available outlets.

3.3 ADJUSTING AND CLEANING

- a. Adjust hardware and leave in smooth, easy condition. Remove protective masking. Clean surfaces ready for use. Restore stained or discolored finishes or replace item.
- b. Inspect, adjust, clean, and test service fixtures according to manufacturer's instructions to assure intended operation.

-- End of Section --