

SECTION 12350  
LABORATORY CASEWORK

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions and Division 1 - General Requirements, apply to work specified in this Section.

1.02 SUMMARY

- A. This Section includes the following:
1. Wood laboratory casework.
  2. Open shelving, wall-mounted and bench mounted types, including supports.
  3. Laboratory utility-chase framing.
  4. Epoxy laboratory countertops.
  5. Chemical resistant plastic laminate countertops.
  6. Polypropylene sinks.
  7. Fittings for plumbing services which are to be installed in epoxy tops, including hot water, cold water, RODI, vacuum, and compressed air service fittings.
- B. Related Work Specified in Other Sections:
1. Wood blocking for anchoring laboratory casework and wall-mounted plumbing trim: Section 06100, "Rough Carpentry"
  2. Metal strapping in gypsum board partitions for anchoring laboratory casework and wall-mounted plumbing trim: Section 09250, "Gypsum Board Assemblies"
  3. Resilient base applied to wood laboratory casework: Section 09650, "Resilient Wall Base and Accessories."
  4. Fume hoods and fume hood base cabinets: Section 11610, "Laboratory Equipment."
  5. Plumbing fixtures in laboratory casework tops: Division 15 plumbing sections.
  5. Electrical service fittings: Division 16.
  6. Connecting service utilities at indicated point: Division 15 and 16 Sections

1.03 DEFINITIONS

- A. Exposed Portions of Casework: Surfaces visible when doors and drawers are closed, including bottoms of wall-cabinets, and visible surfaces in open cabinets or behind glass doors.
1. Ends of cabinets, including those installed directly against walls or other cabinets, shall be considered exposed.
- B. Semi-exposed Portions of Casework: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases which are 78 inches or more above floor are defined as semiexposed.
- C. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

#### 1.04 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: For the following fabrications:
  - 1. Casework: Include plans, elevations, and sections at 1/2" = 1' scale, and details at 3" = 1' scale. Show attachments to other work.
    - a. Indicate locations of blocking and other supports required for installing casework.
    - b. Indicate locations, dimensions, and types of service fittings ( sinks, turrets, elec. raceways, vents, etc.), together with associated service supply connection required.
    - c. Include details of utility spaces/feeds showing all conduits and piping, clearances and access.
    - d. Show adjacent walls, doors, windows, other building components, fume hoods and other laboratory equipment. Indicate clearances from above items.
    - e. Include coordinated dimensions for laboratory equipment specified in other Sections.
    - f. Show joints in epoxy bench tops.
  - 2. Strut framing system assemblies.
- C. Samples for Verification: As follows:
  - 1. 6-inch-square samples of benchtop material.
  - 2. One full-size, finished base cabinet complete with hardware, doors, and drawers, but without countertop.
  - 3. Shelf for open shelving units, including wire edge guards.
  - 4. Shelving standards and brackets.
  - 5. Steel channel framing: 12" long strut; sample of each type of fitting.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience.
- E. Product Test Reports: Based on tests performed by a qualified independent testing agency, indicate compliance of laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.

#### 1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain laboratory casework, including bench tops, sinks, service fittings, and accessories, through one source from a single manufacturer for casework and service fittings/sinks.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver laboratory casework until painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions" Article below.
- B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels through remainder of construction period.

1.08 COORDINATION

- A. Coordinate layout and installation of metal framing and reinforcement in gypsum board assemblies for support of wood laboratory casework.
- B. Coordinate with plumbing and electrical connections.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Wood Laboratory Casework: Subject to compliance with requirements, provide products by one of the following:
  - 1. Fisher Hamilton Scientific, Inc.
  - 2. Kewaunee Scientific Corp.; Laboratory Division.
  - 3. Advanced Lab Concepts
- B. Basis of Design: Drawings and specifications are based on Kewaunee "Signature Series" wood laboratory casework, Style 05, contemporary full overlay design.
  - 1. Intent is to match the casework which is installed in laboratories on the first floor, with respect to cabinet design, wood species, tops and exposed hardware.
- C. Other Components: Subject to compliance with requirements, provide products by one of the following:
  - 1. Polypropylene Sinks: Orion Fittings, Town and Country Plastics, or R&G Sloane
  - 2. Chemical-Resistant Plastic Laminates: Formica Corp., Nevamar Corp., Ralph Wilson Plastics Co.
  - 3. Plumbing Service Fittings: Chicago Faucet Co., T&S Brass and Bronze Works, Inc., or Water Saver.
  - 4. Purified Water (RODI) Service Faucet: Plastinetics, Inc., George Fischer, Inc., or Asahi America

2.02 WOOD CASEWORK MATERIALS

- A. Exposed Materials: Comply with the following:
  - 1. Wood Species: Select White Maple. Match adjacent exposed faces for similarity in color, grain, figure, and natural character markings.
  - 2. Solid Wood: Clear hardwood lumber of species indicated, free of defects, selected for compatible grain and color and kiln dried to 7 percent moisture content.

3. Plywood: Hardwood veneer plywood of species indicated. HPVA HP-1, Grade AA faces at least 1/50 inch (0.5 mm) thick and Grade J crossbands. Edgeband exposed edges with minimum 1/8-inch- (3-mm-) thick, solid-wood edging of the same species as face veneer.

B. Semi-Exposed Materials: Comply with the following:

1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects and kiln dried to 7 percent moisture content. Any hardwood species similar in color and grain to exposed portions.
2. Plywood: Hardwood plywood of any species similar in color and grain to exposed portions. HPVA HP-1, Grade C faces and Grade J crossbands. Semiexposed backs of plywood with exposed faces shall be the same species as faces.

C. Concealed Materials: Any hardwood or softwood species, with no defects affecting strength or utility. Hardwood and softwood lumber kiln dried to 7 and 12 percent moisture content, respectively. Concealed backs of plywood with exposed or semiexposed faces shall be the same species as faces.

D. Glass for Doors: Clear float glass complying with ASTM C 1036, Type I, Class 1, Quality-Q3; not less than 5.0 mm thick.

## 2.03 CASEWORK FABRICATION

A. Design: Provide full flush overlay wood laboratory casework.

B. Construction: Provide wood laboratory casework of the following minimum construction:

1. Bottoms and ends of cabinets, shelves, and tops of wall cabinets and tall cabinets: 3/4-inch plywood.
2. Top frames of base cabinets: 3/4-by-2-inch solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.
3. Backs of cabinets: 3/4-inch plywood where exposed, 1/4-inch hardboard dadoed into sides, bottoms, and tops where not exposed.
4. Drawer fronts: 3/4-inch thick hardwood plywood, vertical grain matched to doors, or matched across doors in multi-door cases.
5. Drawer sides and backs: 1/2-inch solid wood or 7/16-inch plywood, with glued dovetail joints.
6. Drawer bottoms: 1/4-inch hardboard glued and dadoed into front, back, and sides of drawers.
7. Doors 48 inches or less in height: 3/4 inch thick with solid hardwood stiles and rails, particleboard or medium-density fiberboard cores, and hardwood face veneers and crossbands; vertical grain.

8. Doors more than 48 inches in height: 1-1/16 inch thick with solid hardwood stiles and rails, honeycomb cores, and hardwood face veneers and crossbands; vertical grain.
  9. Glazed Doors: 1-1/16-by-3-inch solid hardwood stiles and rails, with mortise and tenon or doweled connections, glued and screwed.
- C. Filler Strips: Provide as needed to close space between cabinets and walls, ceilings, and indicated equipment. Fabricate from the same material and with the same finish as cabinets.

#### 2.04 FINISH FOR WOOD LABORATORY CASEWORK

- A. Preparation: Machine sand lumber and plywood for casework construction before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Hand sand casework after assembling for uniform smoothness at least equivalent to that produced by 220 grit sanding and without machine marks, cross sanding, or other surface blemishes.
- B. Stain: None required.
- C. Chemical-Resistant Finish: Apply manufacturer's standard 2-coat, chemical-resistant, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish. Hand sand and wipe clean between applying sealer and topcoat. Topcoat may be omitted on fully concealed surfaces.
- D. Chemical and Physical Resistance of Finish System: Provide wood laboratory casework with finish system complying with the following requirements for chemical and physical resistance:
1. Chemical Resistance: Capable of withstanding application of not less than 5 drops (0.25 mL) of the following reagents applied to finish surface; covered with a watch glass for 60 minutes, rinsed, and dried; with no permanent change in gloss, color, film hardness, adhesion, or film protection.
 

<ol style="list-style-type: none"> <li>a. Acetic acid (98%).</li> <li>b. Hydrochloric acid (37%).</li> <li>c. Nitric acid (10%).</li> <li>d. Phosphoric acid (75%).</li> <li>e. Sulfuric acid (25%).</li> <li>f. Acetone.</li> <li>g. Benzene.</li> <li>h. Carbon tetrachloride.</li> <li>i. Ethyl acetate.</li> <li>j. Ethyl alcohol.</li> </ol>	<ol style="list-style-type: none"> <li>k. Ethyl ether.</li> <li>l. Formaldehyde (37%).</li> <li>m. Methyl ethyl ketone.</li> <li>n. Toluene.</li> <li>o. Xylene.</li> <li>p. Ammonium hydroxide (28%).</li> <li>q. Potassium hydroxide (40%).</li> <li>r. Sodium carbonate (saturated).</li> <li>s. Sodium chloride (saturated).</li> <li>t. Sodium hydroxide (25%).</li> </ol>
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  2. Moisture Resistance: No visible effect when exposed to the following:
    - a. Hot water at a temperature of 190 to 205 deg F (88 to 96 deg C), trickled down the surface at a 45-degree angle for 5 minutes.
    - b. Constant moisture using a 2-by-3-by-1-inch (51-by-76-by-25-mm) cellulose sponge, soaked with water, in contact with surface for 100 hours.

## 2.05 CASEWORK HARDWARE

- A. General: Furnish units complying with ANSI A156.9 for heavy-duty cabinet hardware, with additional requirements specified in this article. Satin chrome finish (US 26D) on exposed hardware, unless otherwise indicated.
- B. Drawer and Door Pulls: Stainless steel bent wire pulls, 1/4 inch diameter wire, designed to be installed with screws 4 inches on center. Provide 2 pulls for drawers more than 24 inches wide.
- C. Hinges: Grass #1203 Series, or equal by Stanley, 165° fully concealed, self-closing, hinge arm adjustable in 3 directions. Provide 2 for doors less than 48 inches high and 3 for doors more than 48 inches high.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.
- E. Drawer Guides: Full extension, metal-channel, self-closing drawer guides, designed to prevent rebound when drawers are closed, with nylon-tired, ball-bearing rollers, and complying with BHMA A156.9, Type B05091, rated 100 lb (heavy duty).
- F. Drawer and Cupboard Locks: Cylindrical type, 5-pin tumbler and cam, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.
  - 1. Provide locks on all drawers and doors; keyed alike in each room.
  - 2. Provide 2 keys per lock and 6 master keys.
- G. Adjustable Shelf Supports within Cabinets: Flush-mounted, mortised steel standards and steel shelf rests, with epoxy powder-coated finish, complying with BHMA A156.9, Types B04071 and B04091.

## 2.06 EPOXY BENCHTOPS

- A. Epoxy Material: Factory molded, modified epoxy-resin, uniform mixture throughout full thickness with smooth, nonspecular finish.
  - 1. Physical Properties: Comply with the following minimum requirements:
    - a. Flexural strength: 15,000 psi (100 MPa).
    - b. Compressive strength: 30,000 psi (200 MPa).
    - c. Hardness (Rockwell M): 100.
    - d. Water absorption (24 hours): 0.02 percent (maximum).
    - e. Heat distortion point: 350 deg F (177 deg C).
    - f. Thermal-shock resistance: Highly resistant.
  - 2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, test procedure 3.9.5:
    - a. Acetone: Moderate effect.
    - b. Acetic acid (98%): No effect.
    - c. Hydrochloric acid (37%): No effect.
    - d. Nitric acid (70%): No effect.
    - e. Phosphoric acid (85%): No effect.
    - f. Sulfuric acid (33%): No effect.
    - g. Benzene: No effect.

- h. Butyl alcohol: No effect.
- i. Carbon tetrachloride: No effect.
- j. Ethyl acetate: No effect.
- k. Ethyl ether: No effect.
- l. Formaldehyde: No effect.
- m. Phenol (85%): No effect.
- n. Xylene: No effect.
- o. Ammonium hydroxide (28%): No effect.
- p. Sodium hydroxide (50%): Moderate effect.
- q. Zinc chloride: No effect.

3. Color: Black.

B. Fabrication: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Make exposed edges and corners uniformly beveled. Where tops are too long to fabricate without seams, make joints hairline.

- 1. Top Thickness: 1 inch.
- 2. Front and End Edge Configuration: Extend edges 1 inch beyond face of base cabinets. Form as square edge with continuous drip groove on underside 1/2 inch from edge.
- 3. Backsplash: Provide 4-inch high backsplash matching top wherever tops butts a vertical surface, such as a wall or chase, or terminates within 6" of such a surface, and at other locations shown.

## 2.07 PLASTIC LAMINATE BENCHTOPS

A. Manufacturers: Subject to compliance with requirements, provide chemical-resistant laminates manufactured by one of the following:

- 1. Arborite; Division of Premark Canada Inc.
- 2. Formica Corporation.
- 3. International Paper; Decorative Products Division.
- 4. Panolam Industries International Incorporated; Pionite Decorative Surfaces.
- 5. Wilsonart International.

B. Chemical-Resistant Laminate Material: Chemical-resistant plastic-laminate sheet, complying with NEMA LD 3, shop bonded with waterproof adhesive to both sides of 1-3/16-inch-thick core. Sand surfaces to which plastic laminate is to be bonded.

- 1. Plastic-Laminate Type for Formed Countertops: HGP.
- 2. Plastic-Laminate Type for Backing: BKL.
- 3. Chemical-Resistance: Provide product that has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
  - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), amyl acetate, benzene, butyl alcohol, carbon tetrachloride, chloroform, dimethyl formamide, dioxane, ethyl acetate, ethyl alcohol, ethyl ether, formaldehyde (37 percent), gasoline, gentian violet, hydrochloric acid (37 percent), hydrogen peroxide (3 percent), methyl alcohol, methyl ethyl ketone, methylene chloride,

methyl red (1 percent), mono chlorobenzene, naphthalene, nitric acid (30 percent), phenol (90 percent), phosphoric acid (75 percent), silver nitrate (saturated), sodium hydroxide (20 percent), sulfuric acid (77 percent), tincture of iodine, toluene, trichloroethylene, xylene, and zinc chloride (saturated).

4. Products: Subject to compliance with requirements, provide one of the following:
  - a. Lab Grade 840 Black; Formica Corporation.
  - b. Pionite Chemguard; Pioneer Plastics Corp.
  - c. Chemsurf; Wilsonart International, Div. of Premark International, Inc.
5. Color: Black.

C. Countertop Core:

1. Tops with Sink: Hardwood-faced plywood, medium-density-overlaid plywood, or particleboard complying with ANSI A208.1, Grade M-2, Exterior Glue.
2. Tops without Sinks: Same as above, or particleboard complying with ANSI A208.1, Grade M-2.

D. Fabrication: Fabricated units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch, with continuous drip groove on underside 1/2 inch from edge.

1. Construct top and backsplash from one piece of plastic laminate with rolled top edges and coved intersection. Provide separate end splashes of same material as top, fitted to top, where indicated. Finish exposed ends with same plastic laminate as top.
2. Provide hardwood bullnose at front edge.
3. Provide cutouts for penetrations. Radius corners of cutouts 1/8 inch minimum to avoid stress cracking.

2.08 POLYPROPYLENE SINKS

A. Polypropylene Resin: ASTM D4101, Type 110 or Type 210, chemical resistant propylene plastic material suitable for injection molding and extrusion; reinforcement, Grade and detail requirements as determined by the manufacturer for forming and performance.

1. Chemical Resistance: Resistance to the chemicals listed in ASTM F1412, Paragraph 8.3, as determined by testing in accordance with ASTM D543; "resistance" shall mean no effect observed after exposure. Chemicals listed in ASTM F1412 are as follows:

	<u>Chemical</u>	<u>Percent in Water</u>
a.	Acetic acid	5% by volume
b.	Acetone	100% (glacial)
c.	Methyl alcohol	100%
d.	Ammonium hydroxide	10% by volume
e.	Nitric acid	40% by volume
f.	Sodium hydroxide	10% by weight



2. Color: Black
- B. Fabrication: Fabricate sinks molded in one piece with surfaces smooth, corners coved and bottom sloped to outlet; 1/2-inch minimum thickness. Bond sinks to epoxy tops to tops and finish to produce an integral unit with invisible joint line.
- C. Scheduled Sink Units: Provide sizes indicated below, or manufacturer's closest standard size of equal or greater volume, as approved by Architect.
  1. SK-B: 23-inches x 18-inches x 12-inches deep.
  2. SK-D: 23-inches x 18-inches x 12-inches deep.
- D. Accessories: Fabricate accessories from the same material as the sinks.
  1. Outlets: Furnish each polypropylene sink with 1-1/2-inch NPS (DN40) outlets with strainers and tailpieces a minimum of 6 inches long.
  2. Overflows: For each sink provide overflow of standard beehive or open-top design and with separate strainer. Height 2 inches less than sink depth.

## 2.09 ACCESSORIES

- A. Steel Channel Framing System: Provide struts, fittings, and related accessories as required to fabricate the chase and shelf-support assemblies shown on the Drawings, and as follows:
  1. Manufacturer: Subject to compliance with requirements, provide strut framing system by one of the following manufacturers:
    - a. Unistrut Corporation.
    - b. Powerstrut.
    - c. B-Line
  2. Struts: Structural grade steel channels conforming to ASTM A570, Grade 33, or ASTM A 653, Grade 33, sizes shown on Drawings..
  3. Fittings: Steel, conforming to ASTM A 575, A576, A36 or A635.
  4. Metal Finish: Rust-inhibiting acrylic enamel paint, applied by electro-deposition after cleaning and phosphating, and baked. Finish shall withstand minimum 400 hours in salt spray when tested in accordance with ASTM B 117.
    - a. Color: White.
  5. Engineering Design: Design and fabricate strut systems as shown on drawings, and to support the following loads:
    - a. Shelves Above Island Benches: Support dead load of number and lengths of shelves shown, plus 200 pound per linear foot load on the shelves.
    - b. Utility Chases: Support the dead load of the panels and peg boards enclosing the chase, plus one full width shelf carrying 200 pound per linear foot load on each face of the chase parallel to the benches; resist 5 pound per square foot lateral load on all sides of the chase.
    - c. 3-compartment electrical raceway installed at island benches.

- B. Open Shelving: Hardwood veneer shelving with veneer and finish matching cabinets, and with stainless steel wire edge guards in configuration shown on Drawings.
- C. Adjustable Shelf Supports for Wall Shelving: Decorative heavy-duty steel double-slotted standards and 10-1/2 inch deep steel shelf brackets; equal to Knappe & Vogt E3200 standard with E3210 U-shaped brackets; white powder coat finish.
- D. Pegboards: Epoxy boards with polypropylene pegs. Board sizes as shown on Drawings.
- E. Metal Grilles: Extruded aluminum linear bar grille, "pencil-proof" bar spacing; Nailor Industries Model 49-240 or equal; clear anodized finish.
- F. Gas Cylinder Racks: Fabricate from steel channel framing system components specified above, painted finish, with zinc-coated (electro-galvanized) steel eye-bolts and chain.

## 2.10 PLUMBING SERVICE FITTINGS

- A. Scope: Furnish under this Section service fittings which are to be installed in epoxy countertops, in order to ensure coordination between the fittings and the holes or openings in the top which are provided to receive the fittings. Fittings will be installed by the plumbing trade. Furnish fittings complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handles, and similar items.
- B. Quality Assurance: Furnish units that comply with SEFA 7, "Laboratory and Hospital Fixtures Recommended Practices."
- C. Material and Finish: Fabricate service fittings from cast or forged red brass, unless otherwise indicated. Finish exposed surfaces, including fittings, escutcheons, and trim, with a polished chrome plating and clear chemical resistant coating.
- D. Water Valves and Faucets: Provide units complying with ASME A112.18.1M, with renewable seats, designed for working pressure up to 125 psig (860 kPa).
  - 1. Faucet Products:
    - a. Deck Mounted Hot and Cold Water: Chicago Faucets, Model 930.
    - b. Panel Mounted Hot and Cold Water: Chicago Faucets, Model 943
    - c. Panel Mounted RODI: Plastinetics Model 2000-YN-POLYPRO
  - 2. Provide vacuum breakers on water fittings with serrated outlets.
  - 3. Provide aerators on water fittings at island benches that do not have serrated outlets.
  - 4. Valve Handles: 4-arm, forged-brass handles.
- E. Compressed Air and Vacuum Services: Provide deck-mounted turrets with key-cocks for gas and compressed air, as follows:
  - 1. Ground Key Cocks: Tapered core and handle of one-piece forged brass, ground and lapped, held in place under constant spring pressure. Provide units designed for working pressure up to 40 psig (275 kPa). Provide with serrated outlets.

2. Key Cock Handles: Lever-type handles.
  3. Compressed Air and Vacuum Turrets and Key Cocks: Chicago Faucets, Model 980-907B.
- F. Service-Handle Identification: Color-coded plastic discs, with embossed identification, secured to each service-fitting handle to be virtually tamperproof.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcement, and other conditions affecting performance of wood laboratory casework installation.
1. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.02 CASEWORK INSTALLATION

- A. Install plumb, level, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Utility Chase Framing: Secure to floor with 2 fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.
- C. Base Cabinets: Set cabinets straight, plumb, and level. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than 2 fasteners.
- D. Install hardware uniformly and precisely. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- E. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

### 3.03 INSTALLATION OF EPOXY AND PLASTIC LAMINATE BENCHTOPS

- A. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project site processing of top and edge surfaces is not required. Locate field joints where shown on approved Shop Drawings.

- B. Secure epoxy tops to cabinets with epoxy cement, applied at each corner and along perimeter edges of not more than 48 inches o.c.
- C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection. Provide flush hairline joints in tops using clamping devices.
- D. For tops for which holes and cutouts for service fittings were not completed in the factory, provide per approved Shop Drawings.
- E. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- F. Provide scribe moldings for closures at junctures of top, curb, and backsplash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

#### 3.04 INSTALLATION OF ACCESSORIES

- A. Install accessories according to approved Shop Drawings and manufacturer's written instructions.
- B. Securely fasten adjustable shelving supports, and pegboards to partition framing, wood blocking, or reinforcements in partitions and casework.
- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

#### 3.05 INSTALLATION OF SERVICE FITTINGS

- A. Installation shall be by plumbing trade, under Section 15410, "Plumbing Fixtures," in accordance with requirements of Division 15 Sections.

#### 3.06 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at minimum of 48 inches o.c.

END OF SECTION 12350