

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 type, including supports.
 - 3. Epoxy laboratory countertops.
 - 4. Chemical resistant plastic laminate countertops.
 - 5. Laboratory sinks.
 - 6. 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. Electrical service fittings: Division 16.
 - 5. 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 cabinets more than 36 inches (900 mm) above floor, 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 78 inches (1980 mm) 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: Include plans, elevations, and sections at 1/2" = 1' scale, and details at 3" = 1' scale. Show attachments to other work.
 1. Indicate locations of blocking and other supports required for installing casework.
 2. Indicate locations, dimensions, and types of service fittings (sinks, turrets, elec. raceways, vents, etc.), together with associated service supply connection required.
 3. Include details of utility spaces/feeds showing all conduits and piping, clearances and access.
 4. Show adjacent walls, doors and other building components. Indicate clearances from these items.
 5. Show joints in epoxy bench tops.
- C. Samples for Verification: As follows:
 1. 6-inch- (150-mm-) square samples of benchtop material.
 2. Shelf for open shelving units, including wire edge guards.
 3. Shelving standards and brackets.
- 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 with contemporary full overlay style doors.

- C. Other Components: Subject to compliance with requirements, provide products by one of the following:
 - 1. Chemical-Resistant Plastic Laminates: Formica Corp., Nevamar Corp., Ralph Wilson Plastics Co.
 - 2. Plumbing Service Fittings: Chicago Faucet Co., T&S Brass and Bronze Works, Inc., or Water Saver.
 - 3. Purified Water (RODI) Service Faucet: Plastinetics, Inc. (basis of design), 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.

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 (19-mm)** plywood.
 2. Top frames of base cabinets: **3/4-by-2-inch (19-by-51-mm)** solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.
 3. Backs of cabinets: **3/4-inch (19-mm)** plywood where exposed, **1/4-inch (6.4-mm)** hardboard dadoed into sides, bottoms, and tops where not exposed.
 4. Drawer fronts: **3/4-inch (19-mm)** thick hardwood plywood, vertical grain matched to doors, or matched across doors in multi-door cases.
 5. Drawer sides and backs: **1/2-inch (13-mm)** solid wood or **7/16-inch (11-mm)** plywood, with glued dovetail joints.
 6. Drawer bottoms: **1/4-inch (6.4-mm)** hardboard glued and dadoed into front, back, and sides of drawers.
 7. Doors **48 inches (1220 mm)** or less in height: **3/4 inch (19 mm)** 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 (1220 mm) in height: **1-1/16 inch (27 mm)** thick with solid hardwood stiles and rails, honeycomb cores, and hardwood face veneers and crossbands; vertical grain.
 9. Stiles and rails of glazed doors: **1-1/16-by-3-inch (27-by-76-mm)** solid hardwood 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. 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.
- C. 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"> a. Acetic acid (98%). b. Hydrochloric acid (37%). c. Nitric acid (10%). d. Phosphoric acid (75%). e. Sulfuric acid (25%). f. Acetone. g. Benzene. h. Carbon tetrachloride. i. Ethyl acetate. j. Ethyl alcohol. 	<ol style="list-style-type: none"> k. Ethyl ether. l. Formaldehyde (37%). m. Methyl ethyl ketone. n. Toluene. o. Xylene. p. Ammonium hydroxide (28%). q. Potassium hydroxide (40%). r. Sodium carbonate (saturated). s. Sodium chloride (saturated). t. Sodium hydroxide (25%).
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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 (600 mm) 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 (1200 mm) high and 3 for doors more than 48 inches (1200 mm) high.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches (1200 mm) 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 minimum of 2 keys per lock and 6 master keys.
 - 2. Provide locks on 20% of drawers and doors. Locks will be located by the Architect during Shop Drawing review.

- 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 (25 mm).

2. Front and End Edge Configuration: Provide front and end overhang of 1 inch (25 mm) over base cabinets, formed with square edge and continuous drip groove on underside 1/2 inch (13 mm) 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 as 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 (30-mm-) 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 (25 mm)**, with continuous drip groove on underside **1/2 inch (13 mm)** 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 ACCESSORIES

- A. Open Shelving: Hardwood veneer shelving with veneer and finish matching cabinets, and with stainless steel wire edge guards in configuration shown on Drawings.
- B. Adjustable Shelf Supports for Wall Shelving: Decorative heavy-duty steel double-slotted standards and 10-1/2 inch deep steel shelf brackets; equal to Knap & Vogt E3200 standard with E3210 U-shaped brackets.
 1. Finish: White powder coat.
- C. Pegboards: Epoxy boards with polypropylene pegs. Board sizes as shown on Drawings.

2.09 PLUMBING SERVICE FITTINGS

- A. General: Provide units that comply with SEFA 7, "Laboratory and Hospital Fixtures Recommended Practices." Provide fittings complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handles, and similar items.
- B. 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.
- C. 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. Vacuum Breakers: Provide vacuum breakers on water fittings with serrated outlets.
 3. Aerators: Provide aerators on water fittings at cupsinks and island benches that do not have serrated outlets.

4. Valve Handles: 4-arm, forged-brass handles.
- D. 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: Double turret; Chicago Faucets, Model 981-907.
- E. 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. Base Cabinets: Set cabinets straight, plumb, and level. Adjust subtops within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches (600 mm) 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 (1.5 mm).
- C. 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.
- D. 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 (1200 mm) 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. Comply with requirements of Division 15 Sections for installing water and laboratory gas service fittings, and piping.
- B. Install fittings according to approved Shop Drawings and manufacturer's written instructions. Bed bases and flanges of sink- and countertop-mounted fittings in sealant recommended by manufacturer of sink or countertop material. Securely anchor fittings and piping to casework, unless otherwise indicated.

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.

END OF SECTION 12350