

DIVISION 12 – FURNISHINGS

SECTION 12346 - WOOD LABORATORY CASEWORK AND FIXTURES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

Extent of wood laboratory casework and fixtures is shown on drawings.

Work includes the fabrication and installation of standard laboratory furniture components of base cabinets, wall cabinets, storage cabinets, tables, cabinet understructures for fume hoods, shelf units, fume hood, and other units as indicated.

Tops, sinks, accessories and mechanical and electrical service fixtures common to laboratory casework are included as work of this section.

Service fixtures are supplied as part of this work. Installation of service fixtures is included under mechanical work of Division 15 and electrical work of Division 16.

SUBMITTALS

Product Data: Submit manufacturer's data and installation instructions for each type of laboratory furniture unit.

Include independent laboratory certification that applied finish complies with specified chemical and physical resistance requirements.

QUALITY ASSURANCE

Single Source Responsibility: Provide laboratory casework with tops, sinks, and service fixtures, manufactured or furnished by same laboratory furniture company for single responsibility.

PRODUCT HANDLING AND STORAGE

Deliver laboratory furniture only after wet operations in building are completed.

Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

WARRANTY

The manufacturer shall guarantee all materials and workmanship provided for a period of one year from date of substantial completion. Any defects due to the use of improper material or workmanship on the part of manufacturer occurring within that time shall be promptly rectified, by repair or replacement of the defective materials or correction of defective workmanship by manufacturer at his own expense, after notification by the Owner.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS

Provide laboratory casework produced by Kewaunee Scientific Corp., Hamilton or approved equal.

WOOD FURNITURE

MATERIALS

General: All materials shall be the best of their respective kinds for the purpose intended and all methods used in construction shall conform to the best practices of the Scientific Laboratory Equipment Industry, including any specialized materials required.

Woods: All woods shall be carefully and thoroughly air-dried, then kiln dried by the laboratory equipment manufacturer in his own humidity controlled kilns to a moisture content of 4-1/2%. Temper kiln dried lumber to a moisture content of 6% before use. Maintain moisture content throughout production.

Exposed Surfaces: Provide Appalachian red oak for all exposed exterior casework surfaces, the exposed interior ends, top and bottom of open cases or cases having glazed doors.

Backs: Provide printed hardboard backs finished to match interior.

The solid woods used for exposed surfaces shall be clear, with color and graining in conformance with the normally

accepted standards required of the Scientific Laboratory Equipment Industry. The finished installation shall provide an attractive and harmonious appearance.

Exposed Plywood: Provide oak faced veneer or solid wood core plywood used for exposed exterior surfaces, exposed interior ends, top and bottom of open cases.

Plywood used for doors under 48" high shall be 3/4" thick core with crossbands of 1/20" Poplar, exterior face of 1/32" thick plain sliced Select Grade 1 Oak and back face of 1/32" thick sound Oak. Use of particleboard or a construction allowing telegraphing of core joints will not be acceptable.

Interior Plywood: Provide clear Poplar Grade A veneer face, Grade B back for all interior plywood used in cabinets and cases, unexposed. All interior plywood shall have high grade clear veneers and assembled with poly-vinyl emulsion glue.

Provide 7-ply poplar plywood with oak banding for all interior unexposed shelves.

Tempered Hardboard: Provide tempered hardboard of a wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface.

HARDWARE AND TRIM

Drawer and Door Pulls: Provide drawer and door pulls of modern design, offering a comfortable hand grip and securely fastened to doors and drawers with vandal-proof screws. All pulls shall be satin finish aluminum, with a clear, lacquer finish. Provide two pulls on all drawers over 24" long. All pulls shall be usable by the handicapped.

Use of plastic pulls (molded or extruded), or a design not compatible for usage by the handicapped will not be acceptable.

Finger holes or slots machined into doors will not be acceptable.

Hinges: Provide five (5) knuckle institutional hinges, offset type for all swinging doors. Hinges shall be 2-1/2" long, one (1) pair for doors under 4 ft. in height and 1-1/2 pair on doors over 4 ft. in height. Mount hinges with flathead screws, applied to door and cabinet to withstand a weight load of 150 lbs. minimum.

Hinge finish: satin finish stainless steel.

Locks: Not required.

Magnetic Latches: Provide magnetic latches on all swinging doors. Enclose latches in a plastic case and operate against a strike plate on door. Provide latch on both leaves of double doors without locks. Provide full height cases with latching devices located on the structurally fixed center shelf. Provide a positive catch on left hand door and magnetic type latch on right hand door.

Drawer Stops: Provide cadmium or chrome plated steel drawer stops on the inside back of each drawer, so designed as to prevent the accidental removal of the drawer.

Base Molding: Provide 4" high base molding of a pliable, black vinyl material with an adhesive backing. Secure molded plastic corner clips to all exposed corners.

Use of a rigid material, which does not follow contour of floor or offer water-seal and dust-proofing qualities, will not be acceptable.

Leveling Devices: Furnish leveling devices only where shown or specifically called for, adaptable to table legs or the bottom corners of base cabinets. Device shall consist of a 1/2" dia. bolt threaded through a 1/2" tee nut which is securely screwed to bottom of leg, or to 1-5/8" U-shaped 12 gauge metal bracket with leveling bolts mounted at the four bottom corners of a base cabinet. Provide cadmium plated steel bolts with a hexagonal head to provide bearing against a 12 gauge flat steel floor plate. Install bolts to be accessible for adjustment through cupboard bottoms and drawer openings when installed on base cabinets.

Shelf Support Clips: Provide pin type corrosion resistant coated shelf support clips for mounting on interior of cabinet work, to retain shelves from accidental removal. Shelves are adjustable on 2" centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.

WOOD CASEWORK FINISH AND PERFORMANCE REQUIREMENTS

Wood Finish: Prior to application of the wood finish, sand case and cabinet surfaces to remove loose fibers, scratch marks and abrasions. Thoroughly remove all dust removed by compressed air.

Wood Finish Application: Apply finishes under controlled atmospheric conditions, cured after application in a modern humidified oven at 140 degrees F. and 30% relative humidity.

Wood Casework Finish (Interiors): Provide interiors surfaces and unexposed exteriors with a double-pass coat of resinous wood sealer. Wax drawer glides and keels after sealing.

Wood Casework Finish (Exteriors): Provide case and cabinet exposed exterior surfaces, including interiors of glazed cases and open shelving, with an acid, alkali, solvent, water and abrasion-resistant finish. Coat surfaces with a non-fiber lifting stain, or toner to secure the desired color and thoroughly dried. The first sealer coat shall be applied, thoroughly dry, sanded and carefully dusted with tack rags. Apply a second sealer coat and thoroughly dry. Apply a double pass coat of chemical resistant synthetic varnish and thoroughly dried, providing a semi-gloss finish. (Omit color coat when a natural Oak finish is required.) The completed case and cabinet exterior finish shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

Chemical Spot Test Performance Test Requirements: Conduct chemical spot tests by applying 5 drops of each reagent to the surface to be tested. Cover each reagent (except those marked **) with a 1-1/4" dia. water glass, convex side down to confine the reagent. Spot test volatile solvents mared ** as follows: Saturate a 1" ball of cotton with solvent and place on the surface to be tested. Cover the cotton ball with an inverted 2-ounce wide mouth bottle to retard evaporation. Conduct all spot tests in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77 degrees F + 3 degrees F. At the end of the test period, the flush the reagents from the surface with water, and scrub the surface with a soft bristle brush under running water, then rinse and dry. Clean volatile solvent test areas with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

Reagents*	Time in Minutes	Test Ratings
Acetone**	60	A
Ammonium Hydroxide, 28%	60	A
Benzene**	60	A
Carbon Tetrachloride**	60	A
Ethyl Acetate**	60	A
Ethyl Alcohol**	60	A
Ethyl Ether**	60	A

Gasoline**	60	A
Glacial Acetic Acid, 99%	60	A
Hydrochloric Acid, 37%	60	A
Methanol**	60	A
Methyl Ethyl Ketone**	60	A
Naphtha**	60	A
Nitric Acid, 30%	60	A
Phosphoric Acid, 75%	60	A
Potassium Hydrozide, 40%	60	A
Sodium Hydrozide, 40%	60	A
Sodium Hydrozide, 10%	60	A
Sulfuric Acid, 70%	60	A
Toluene**	60	A

*Where concentrations are indicated, percentages are by weight.

**Indicates these solvents tested with cotton and jar method.

Heat Resistance Performance Requirements: Trickle hot water (190 degrees F - 205 degrees F) on the finished surface, set at an angle of 40 degrees from horizontal, for a period of 5 minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.

Moisture Resistance Performance Requirements: soak a 2" x 3" x 1" cellulose sponge with water and place on the finished surface for a period of 100 hours. Maintain the sponge in a wet condition throughout the entire test period. At the end of the test period, the surface shall be dried and no visible effect shall be shown on the finish.

Impact Resistance Performance Requirements: Drop a 1 lb. steel ball (approximately 2" dia.) from a distance of 1 ft. onto the finished surface of a 3/4" thick plywood panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close examination.

WOOD CASEWORK CONSTRUCTION

Base Cabinets (Swinging Door and Drawer):

Provide 3/4" thick poplar plywood cabinet and panels with 1" x 3/4" oak hardwood facing. Glue end panels to top, bottom and all intermediate frames utilizing blind mortise and tenon joints, and countersunk screws. Cabinet backs shall be 3/16" thick non-print hardboard, rabbeted into the end panels. Cupboard, sink and fume hood units shall have removable panels allowing access to plumbing chase, but designed to protect the interiors from dust or vermin. Provide 1/4" thick tempered hardboard cupboard bottoms over the 3/4" bottom frame, removable to allow access to floor area. Provide all base units with full-width adjustable shelves, 3/4" thick, 7-ply poplar plywood with oak banding on exposed edge integrally joined to form a totally enclosed cabinet. Provide 2-1/2" x 4" high casework toe space. The following frame sizes shall be considered a basic construction:

Top Horizontal:	Side and Rear Member	1-3/4" x 1-1/4" Hardwood
	Front Member	2-1/4" x 1-1/4" Oak
	Center Mullion	2-1/2" x 1-1/4" Hardwood
Intermediate		
Horizontal:	Front Member	1-3/4" x 3/4" Oak
	Side and Rear	1-3/4" x 3/4" Hardwood
	Center Mullion	2-1/2" c 3/4" Hardwood
Bottom		
Horizontal:	Side and Rear	1-3/4" x 3/4" Hardwood
	Center Mullion	2-1/2" x 3/4" Hardwood
Front Member		
	Bottom (removable)	1/4" Tempered Hardboard

Drawers: Provide 7/16" thick, 7-ply, solid oak plywood drawer sides with a 3/4" thick solid wood core, oak veneer drawer head. Provide glue and dove-tailed type joints on all drawers over 3" in depth, a mortise and tenon joint for shallow drawers. Provide 1/8" thick tempered hardboard drawer bottoms, set and glued into 1/4" grooves, four sides.

Drawer Suspension: All drawers shall utilize a suspension consisting of two hardwood members, a drawer keel and a mating case channel. Provide one pair on all drawers up to 24" wide, two pair on all drawers over 24" wide. Drawer keels shall be 1-13/16" wide, chamfered to a 30 degree angle, allowing it to mate with the 3" wide case channel.

Case bottoms shall be 1/2" thick oak plywood, exposed to view, or 1/2" thick Poplar plywood, unexposed, rabbeted and glued securely to end panels. Glue blocks, 3" long, shall further support and strengthen all joints. Provide all cases

22" in depth with a 1/2" thick oak plywood bottom and a 4" wide x 3/4" thick oak hardwood facing. Provide flush case interior. Provide a 2-1/2" x 4" high totally enclosed toe space. Other sizes and materials are as follows:

End Panel: 3/4", 7-ply Poplar plywood w/1" x 3/4" Oak facing
Top: 3/4", 7-ply Poplar plywood
Top Facia: 3/4" x 2-1/2" solid oak
Bottom: 1/2" Oak plywood, exposed to view;
1/2" Poplar plywood, unexposed,
(without toe space)
Base Rail: 1" x 4-3/4" solid Oak, (without toe space)
Bottom: 1/2" Oak plywood, exposed to view,
1/2" Poplar plywood, unexposed
(22" deep) with 4" wide solid Oak facing.
Toe Space Rail: 3/4" x 4" Hardwood plywood

Counter Mounted or Wall Hung Sliding Door Cases: Construction and materials shall be the same as for full height type cases with the following exception: Provide bottom of 3/4" Hardwood plywood with a 2-1/4" x 3/4" Oak facia for unexposed interiors and a 3/4" Oak plywood bottom with 2-1/4" x 3/4" Oak facia exposed interiors. Provide 3/4" thick solid hardwood core panel doors under 48" in height, and 1" thick hollow core, hardwood framed for 48" high cases. Glass framed doors shall be 3/4" thick with 3-3/16" wide solid oak framing under 48" in height, and 1" thick by 3-3/16" solid oak framing for 48" high cases. Provide 1/4" thick float glass solid glass doors with polished edges and ground finger groove. Set doors in an aluminum bottom framing containing roller bearings and held in position with an aluminum guide at the top of the case.

TABLE TOPS AND WORKING SURFACES

Resin Bonded Fiberboard Tops (at shelving only): Treated wood fibers formed under pressure with a highly moisture resistant resin to form a solid substrate, 1" thick. The top material shall have an optimum resistance to warp or twist and have average density of 52 lb./cu.ft. Provide all worktops with a 3/16" wide by 1/4" deep drip groove around exposed edges; a 1/4" radius at all exposed corners and a similar radius along all exposed to edges of the work surface. Apply multiple coats of highly resistant resinous coatings, integrally bonded to the worktops through its application and conversion by a high heat baking process.

The resultant finish shall provide an acid, alkali, and solvent resistant surface.

Color: Provide in uniform black color finish.

Molded Epoxy Resin Tops (at all countertops): Molded from a modified epoxy resin that has been especially compounded and cured to provide the optimum physical and chemical resistance properties required of a heavy-duty laboratory table top.

Tops and Curbs: Provide a uniform mixture throughout thickness. Tops and curbs shall be non-glaring and black in color. Provide 1" thick table tops, with drip grooves provided on the underside at all exposed edges. Provide all exposed edges except as indicated below, rounded to a 1/4" radius at front top edge and at vertical corners. Integrally molded 4" high curbs at the backs and ends of standard 31" and 24" wide tops shall be 3/4" thick, and the juncture between top and curb covered to a 3/4" radius. Provide curbs on special width tops and around special cutouts of the same thickness as the tops, bonded to the surfaces of the top to form a square joint.

Sink Cutouts: Smooth and uniform without saw marks and the top edge with a uniform radius of approximately 1/8". Finish the bottom edge of the sink opening smooth with the edge broken to prevent sharpness. Radius corners of the sink cutouts not less than 3/4".

PERFORMANCE TESTS FOR MOLDED EPOXY RESIN

Heat Resistance Performance Test Requirements: There shall be no blisters, cracks or any breakdown of the top surface due to heat of standard Bunsen burner.

Chemical Resistance Performance Test Requirements: Tops shall resist chemical attacks from normally used laboratory reagents.

SINKS

Provide sinks of an especially modified epoxy resin, carefully compounded with selected materials to provide maximum physical and chemical properties. Provide non-glaring sinks, black in color with all inside corners covered and the bottom pitched to the drain outlet. Sinks shall possess a high resistance to mechanical and thermal shock meeting the following mechanical and physical strength requirements:

Provide removable overflow drain pipes for all sinks.

Tensile Strength	9,500 PSI
Compressive Strength (A.S.T.M. Method D695-77)	35,000 PSI
Flexural Strength (A.S.T.M. Method D790-71)	19,000 PSI
Hardness, Rockwell M (A.S.T.M. Method D785-65)	115
Specific Gravity	1.93

Water Absorption (A.S.T.M. Method D570-77)	
% by weight, 24 hours	0.02
% by weight, 7 days	0.04
% by weight, 2 hour boil	0.04

MECHANICAL SERVICE FITTINGS

Laboratory Service Fittings: Provide laboratory grade service fittings, with water faucets and valve bodies of cast red brass allow or bronze forgings, with a minimum content of 85%. Provide chromium plated fittings unless specified otherwise.

Water Fittings: Provide water fittings with a renewable unit containing all operating parts which are subject to wear. The renewable unit shall contain an integral volume control device and all faucets shall be capable of being readily converted from compression to self-closing, without disturbing the faucet body proper. four (4) arm forged brass handles shall contain plastic screw-on type colored service index buttons.

Ground Key Valve Hose Cocks: Provide ground key type valves with forged body and 10 serration hose end. Provide forged brass handle plug, long, tapered type with screw-on colored service index button. Individually ground, lap and seal valve.

Gooseneck Type Outlets: Provide gooseneck outlets with a separate brazed coupling to provide a full thread attachment of anti-splash, serrated tip or filter pump fittings.

Services Indexes: Provide fittings identified with service indexes in the following color coding:

Service Lettering ID	Color
Hot Water HW	Red
Cold Water CW	Dark Green
Gas Dark GAS	Dark Blue
Air AIR	Orange
Vacuum VAC	Yellow
Distilled Water DW	White

Sink Outlets: Unless otherwise specified, provide molded epoxy resin sink outlets for other than stainless steel sinks, with integral cross bars, tapered for overflow and be

complete with gasket and lock nut with 1-1/2" I.P.S. mail straight thread outlet.

Vacuum Breakers: Provide "Nidel" or "Watts" vacuum breakers unless otherwise specified or identified to be an integral part of the water fixture assembly.

Aerator Outlets: Furnish aerator type outlets for all gooseneck water faucets.

PART 3 - EXECUTION

CASEWORK INSTALLATION

Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where laboratory furniture abuts other finished work, scribe and apply filler strips for accurate fit with fasteners concealed where practicable.

Base Cabinets: Set cabinets straight, plumb, and level. Adjust sub-tops within 1/16" of a single plane. Fasten each individual cabinet to floor at toe space, with fasteners spaced 24" o.c. Bolt continuous cabinets together. Secure individual cabinets with not less than 2 fasteners into floor, where they do not adjoin other cabinets.

Where required, assemble units into one integral unit with joints flush, tight and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16".

Wall Cabinets: Securely fasten to solid supporting material, not plaster, lath, or wallboard. Anchor, adjust and align wall cabinets as specified for base cabinets.

Reinforcement of stud walls to support wall-mounted cabinets will be done during wall erection by trade involved, but responsibility for accurate location and sizing of reinforcement is part of this work.

Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

INSTALLATION OF TOPS

Field Jointing: Where practical, make in same manner as factory jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Locate field joints as shown on accepted shop drawings, factory prepared so there is no job site processing of top and edge surfaces.

Fastenings: Use concealed clamping devices for field joints, except for natural stone, composition stone and epoxy tops, located within 6" of front, at back edges and at intervals not exceeding 24". Tighten in accordance with manufacturer's instructions to exert a constant, heavy clamping pressure at joints. Except for natural stone, composition stone and epoxy tops, secure tops to cabinets with "Z"-type fasteners or equivalent, using 2 or more fasteners at each front, end, and back.

For natural stone, composition stone, and epoxy tops, secure to cabinets with epoxy cement applied at each corner and along perimeter edges at not more than 48" o.c.

Workmanship: Abutt top and edge surfaces in one true plane, with internal supports placed to prevent any deflection. Provide flush hairline joints in top units using clamping devices. At stone-type material joints, use manufacturer's recommended adhesives and holding devices to provide joint widths not more than 1/16" wide at any location, completely filled and flush with abutting edges.

Where necessary to penetrate tops with fasteners, countersink heads approximately 1/8" and plug hole flush with material equal in chemical resistance, color, hardness, and texture to top surface.

After installation, carefully dress joints smooth, remove any surface scratches, clean and polish entire surface.

Provide holes and cutouts as required for mechanical and electrical service fixtures.

Provide scribe mouldings for closures at junctures of top, curb and splash with walls as recommended by manufacturer for materials involved. Use chemical resistant, permanently elastic sealing compound where recommended by manufacturer.

INSTALLATION OF SINKS

Underside Installation: Use manufacturer's recommended adjustable support system for table-type and cabinet-type installations.

Set top edge of sink unit firmly pressed to counter top, set in manufacturer's recommended chemical resistant sealing compound to product a tight and fully leakproof joint. Adjust sink and securely support to prevent movement.

INSTALLATION OF ACCESSORIES

Install in a precise manner in accordance with manufacturer's directions. Turn screws to a flat seat; do not drive. Adjust moving parts to operate freely without excessive bind.

CLEANING AND PROTECTION

Repair or remove and replace defective work as directed upon completion of installation.

Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

Protection: Advise Contractor of procedures and precautions for protection of materials and installed laboratory furniture from damage by work of other trades.

**END OF SECTION 12346 – WOOD LABORATORY
CASEWORK AND FIXTURES**