SECTION 12346
WOOD LABORATORY CASEWORK

PART 1 – GENERAL

1.1 SUMMARY

A. Related Sections:

1. Section 12345 – Metal Laboratory Casework

2. Tops, sinks, accessories and mechanical and electrical service fixtures common to laboratory casework.

3. Service fixtures are supplied as part of this work. Installation of service fixtures is included under Division 15.

1.2 DEFINITIONS:

A. The following definitions apply to wood casework units.

1. Exposed portions of casework including end panels and all surfaces visible when doors and drawers are closed, bottoms of cases more than 42" above floor, top of cases less than 72" above floor, and visible members in open cases or behind glass doors.

2. Semi-exposed portions of casework includes those surfaces behind solid doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms and the interior face of doors. Tops of cases 6'-0" or more above floor and bottom of cabinets more than 30" but less than 42" above floor shall be considered as semi-exposed.

3. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation or cabinets less than 30" above finished floor.

1.3 SUBMITTALS:

A. Product Data:

1. Submit manufacturer's data and installation instructions for each type of wood laboratory casework unit.

a. Include independent laboratory certification that applied finish complies with specified chemical and physical resistance requirements.
2. Provide certification and chain of custody documentation showing that wood based materials came from Forest Stewardship Council certified sources. (LEED MRc7: Certified Wood)

3. Provide documentation from the manufacturer identifying VOC and chemical component limits for all wood glues and sealants. (LEED EQc4: Low-Emitting Materials)

4. Provide documentation from the manufacturer showing that all composite wood products provided do not contain urea-formaldehyde resin. (LEED EQc4: Low-Emitting Materials)

B. Shop Drawings:

1. Submit shop drawings for wood laboratory casework showing plans, elevations, ends, cross-sections, utility run spaces, location and type of service fixtures with lines thereto. Show details and location of anchorages, blocking, and fitting to floors, walls, and base.

2. Include layout of units with relation to surrounding walls, doors, windows, other building elements, and laboratory equipment.

3. Coordinate shop drawings with other work involved.

C. Test Reports:

1. Submit test reports from qualified independent testing laboratory showing compliance with laboratory casework finishes specified for chemical and physical resistance.

2. Submit load test reports for drawers, suspension slides, and unit shelving.

1.4 QUALITY ASSURANCE:

A. General:

1. Provide wood laboratory casework manufactured or furnished by the same company for single responsibility.

B. Manufacturer's Qualifications:

1. Manufacturer with updated plant and proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and meeting construction schedule time restraints. Manufacturer must have a minimum of 10 years experience in manufacturer of wood laboratory casework and at least 10 successful installations of equal or greater complexity as indicated.

C. Installer's Qualifications:
1. Installer must be certified by the manufacturer and have successfully completed at least 5 installations of wood laboratory casework of equal or greater complexity as indicated.

D. Testing Laboratory Qualifications:

1. Independent testing laboratory must demonstrate that it has experience and qualifications to conduct testing based upon documentation according to ASTM E548.

E. Flammable Liquid Storage:

1. Where cabinets are for solvent or flammable liquid storage, provide units that are listed and labeled as complying with the requirements of NFPA 30 for design, construction, and capacity of storage cabinets and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

F. Chemical and Physical Resistance of Finish:

1. Submit an independent testing laboratory report certifying that the (exterior) finish of wood casework is capable of withstanding the following tests, with no change, or slight change of gloss, slight discoloration, or slight temporary softening of the film with no loss of adhesion and no loss of film protection as defined in the Performance Ratings.

G. Performance Ratings:

1. (NE) No effect: No detectable change in surface material.
2. (EX) Excellent: Slight detectable change in color or gloss, but no change to the function or life of the working surface material.
3. Good: A clearly discernable change in color or gloss, but no significant impairment of working surface function or life.
4. Fair: Objectionable change in appearance due to surface discoloration or function over an extended period of time.
5. (FL) Failure: Pitting, cratering or erosion of working surface material. Obvious and significant deterioration.

H. Acids: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test
panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.

1. Acetic Acid (50% or 75%) (EX)
2. Acetic Acid, Glacial (EX)
3. Formic Acid (EX)
4. Hydrochloric Acid (37%) (NE)
5. Hydrofluoric Acid (48%) (NE)
6. Hydrogen Peroxide (30%) (NE)
7. Nitric Acid (30%) (G)
8. Phosphoric Acid (75%) (EX)
9. Sulfuric Acid (50% or 70%) (EX)

I. Solvent: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.

1. Acetone (EX)       Gasoline (NE)
2. Amyl Acetate (NE)  Kerosene (NE)
3. Butyl Alcohol (NE) Methyl Ethyl Ketone (EX)
4. Ethyl Alcohol (NE) Monochlorobenzene (NE)
5. Methyl Alcohol (EX) Napthalene (NE)
6. Cresol (G)         Phenol (EX)
7. Dimethyl Formamide (G) Silver Nitrate (10%) (NE)
8. Dioxane (NE)       Sodium Sulfide, saturated (NE)
9. Ethyl Acetate (NE) Tincture of Iodine (G)
10. Ethyl Ether (NE)  Toluene (NE)
11. Formaldehyde (NE) Trichlorethylene (NE)
12. Furfural (EX)     Xylene (NE)

J. Bases and Salts: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.

1. Ammonium Hydroxide (15%, 20%, or 25%) (NE)
2. Glycerine (NE)
3. Potassium Hydroxide (25%, 35%, or 45%) (NE)
4. Saturated Sodium Carbonate (NE)
5. Saturated Sodium Chloride (NE)
6. Saturated Zinc Chloride (NE)
7. Sodium Hydroxide (40% or 50%) (NE)
8. Sodium Hypochlorite, (5.25%) (NE)

K. Moisture and Heat Resistance: No visible effect when finish surface exposed to the following:

1. Hot water at a temperature of 190° F. to 205° F., trickled down the surface at 45° angle for 5 minutes.
2. Constant moisture using a 2" x 3" x 1" cellulose sponge, soaked with water, in contact with the surface for 100 hours.

1.5 WARRANTY:

A. The manufacturer shall guarantee all materials and workmanship provided for a period of 1 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.

1. Furnish drawer construction and drawer guides with limited lifetime warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Fisher Hamilton Scientific, Inc.
B. Kewaunee Scientific Corp.; Laboratory Division
C. Mohon International, Inc.; Campbell Rhea

2.2 MATERIALS:

A. General:

1. Carefully and thoroughly air-dry all woods, then kiln dry by the laboratory casework manufacturer in humidity controlled kilns to a moisture content of 4.5%. Temper kiln dried lumber to a moisture content of 6% before use. Maintain moisture content throughout production.

2. All wood based products must come from "FSC Certified Wood" sources certified by the Forest Stewardship Council. Materials should be designated "certified wood." (LEED MRc7: Certified Wood)

3. All composite wood must not contain urea-formaldehyde resin binders. (LEED EQc4: Low-Emitting Materials)

4. All wood glues and sealants must meet the VOC and chemical component limit requirements of South Coast Air Quality Management District Rule #1168 and sealants used as fillers must not exceed the limits of the Bay Area Air Quality Management District Regulation 8, Rule 51 requirements. (LEED EQc4: Low-Emitting Materials)

B. Exposed Materials:
1. Do not use exposed faces of lighter-than-average color joined with exposed faces of darker-than-average color. Do not use two adjacent faces which are noticeably dissimilar in grain, figure, and natural character markings.

   a. Solid Wood: Clear, dry, sound, plain sawn, selected for compatible grain and color, no defects.

   b. Plywood Face Veneer: Same species as exposed solid lumber, clear, selected for grain and color compatible with exposed solid lumber, no defects. Provide HPVA HP-1, Grade AA faces at least 1/50" thick and Grade J crossbands. Provide solid crossbandings without voids using water resistant resin glue. Edge band exposed edges with 3 mm solid wood of same species as face veneer.

   c. Plywood Core: 7 ply veneer core.

   d. Glue: Water resistant resin glue.

C. Semi-Exposed Materials:

   1. Solid Wood: Dry, sound, plain sawn, selected to eliminate appearance defects. Any species of hardwood of similar color and grain to exposed portions.

   2. Plywood: Hardwood, HPVA HP-1, Grade C faces and Grade J crossbands, plain sliced, any species to match color and grain of exposed members.

D. Concealed Materials:

   1. Solid Wood or Plywood: Of any species, with no defects affecting strength or utility.

   2. Hardboard: AHA A135.4, Class 1, tempered.

   3. Concealed Framing, Connectors: Manufacturer's standard.

E. Acid Storage Cabinet Lining:

   1. 1/4" thick, fiber cement board, ASTM C1186.

F. Glass:

   1. Clear Float Glass: ASTM C1036, Type I, Class 1, 0.125" or 0.25" thickness, quality q3 (glazing select).

      a. Locations:

         1) Framed glass wall and upper cases, 1/8" thickness.
2) Framed glass tall cases, 1/4" thickness.

2.3 FABRICATION:

A. General:

2. Interior of units to be fabricated to provide a smooth flush finish. Do not offset cabinet bottom with front face frame.

3. Dowel, glue, and screw all joints, except for drawer fronts, sides and backs, using precision jigs and clamps to insure square corners and plumb vertical surfaces. For drawer fronts, sides, and backs use chuck and bore construction at 32 mm on centers.

4. Assemble units in the shop in as large components as practicable to minimize field cutting and jointing.

5. Provide scribes and fillers as required.

2.4 FINISH:

A. Finish on all wood equipment shall be in accordance with the following:

1. All surfaces to be finished shall be sanded smooth, free from dirt, defects, and mill marks resulting from machining.

2. All finishing materials shall be free from all dirt and foreign matter, of superior quality, highly chemical resistant, evenly applied under proper room temperatures. They shall be completely dried under controlled conditions before applying subsequent coats.

3. Finish for exterior and exposed portions of casework shall consist of an application of clean stain of the required color and multiple coats of highly chemical resistant acrylic urethane finish, force dried, sanded and wiped clean between coats. The resultant coating shall be a smooth, satin luster finish of not less than 1.5 mils dry film thickness.

   a. Interior finish for all cases where semi-exposed to view shall be the same as for exteriors, except 1.0 mils dry film thickness.
b. Finish for drawer head exteriors to be three coats of chemically resistant acrylic urethane. Two coats of chemically resistant acrylic urethane to be applied to drawer sides and back. Finish drawer interior with 7 level polyester acrylic finish.

c. Exterior finish shall be water clear and bright. Cloudy, muddy or finishes carrying tinting pigments are not acceptable.

d. Finish, exterior and interior, shall be force dried in a dust free atmosphere.

e. Completed finish shall be resistant to acids, alkalis, salts, and solvents in accordance with the tests specified in this section.

2.5 SPECIAL PURPOSE STORAGE CABINETS:

A. Acid Storage Cabinets:

1. Acid storage cabinets shall be completely lined with a corrosion resistant liner.

2. Cabinet is specifically designed for the storage of acids and bases.

3. Provide a full depth removable shelf of the same material as cabinet and lined with a corrosion resistant liner.

4. Provide a liquid tight pan covering on the entire bottom of the cabinet or similar devise, to provide containment for leaks and spills.

5. Below fume hoods, vent each cabinet through the hood work surface with a 1.5” corrosion resistant rigid vent pipe. Vent pipe may be increased to a larger diameter, once pipe extends above fume hood, per Mechanical design. The acid vent kit shall be polypropylene supplied by cabinet vendor. Hood base corrosive cabinets shall be vented through hood work surface using Manufacturer’s vent kit. When two corrosive cabinets are used, each cabinet must be vented separately through work surface. Vent duct shall terminate below lower baffle and at least 1” above work surface. Penetration between work surface and vent duct must be sealed with chemical resistant type caulk. When acid cabinets are installed below fume hoods, the doors should be louvered.

B. Solvent Storage Cabinets:

1. Specifically design solvent cabinet for the storage of flammable and combustible liquids. Base construction upon the requirements listed by UL, OSHA and NFPA No. 30.

2. Provide units with a maximum internal temperature of 325°F, when subjected to a 10-minute fire test using a standard time-temperature curve per Article 42 of NFPA No. 30.
3. Fabricate the bottom, top, sides and doors of 18-gage steel with all double panel construction and a 1.5” air space between panels. Furnish with electrical grounding connection.


5. Provide self-closing doors synchronized so that both doors will always fully close. Equip right hand door with three point latching system that automatically engages when doors close. Equip door latch system with lock. Equip each door with a fusible link hold open feature to ensure the door closes when the temperature outside of the cabinet exceeds 165°F.

6. Provide a 2” deep liquid tight pan covering on the entire bottom of the cabinet to provide containment for leaks and spills.

7. Provide a full depth, adjustable shelf and designed to allow circulation within the cabinet.

8. Vent each cabinet into building hazardous exhaust system with a 1.5” corrosion resistant rigid vent pipe. Materials used for venting must meet an NFPA Flame Spread Rating of 25 or less. Vent pipe may be increased to a larger diameter per Mechanical design. Below fume hoods, vent pipe is restricted to 1.5” diameter to make connection from back of cabinet to top of fume hood. Vent pipe may be increased to a larger diameter, once pipe extends above fume hood, per Mechanical design. Provide a minimum of 10 air changes per hour. Two such vents must be provided, one high and one low and each must have a fire baffle.

C. Vacuum Pump Cabinets:

1. Specifically designed metal cabinet to provide a means to store and vent vacuum pumps and their emissions and heat loads.

2. Vacuum pump cabinet shall have hinged doors with integral toe space without a cabinet bottom. Vacuum pump cabinet shall have removable and solid back panel(s) for utility access and visual inspection. Back panel shall incorporate an integral 2-1/2" vent hole for a separate vent assembly.

3. Vacuum pump cabinet shall incorporate acoustical insulation on the interior door panels, side, back and underside of the top panel. Insulation shall be an open cell foam of conal design.

4. Storage unit shall incorporate an integral electrical switch (120V, 20 amp) with pilot light to indicate the operational mode of the vacuum pump unit.

5. Storage unit shall have an electrical duplex outlet, located in the rear of the cabinet, for the vacuum pump plug end. Outlet to be accessible from the inside of the cabinet. Outlet shall be hard-wired to the electrical switch.
6. Separate mobile platform shall be capable of supporting 300lbs. Front two casters shall be locking/swivel models. Lipped construction shall safely contain any incidental spills or provide a 2” deep liquid tight pan covering on the entire bottom of the cabinet to provide containment for leaks and spills.

7. Optional door louvers will be incorporated when the exhaust fan is specified.

8. Switch shall be supplied with an optional 20' long, 1/2" trade size flexible metal conduit.

9. Optional variac voltage transformer (mounted in flush panel) shall be factory installed in the flush front panel to provide a variable voltage source for instrumentation. Variac shall include a metal enclosure, cover plate, toggle switch, duplex electric receptacle, fuse holder and pilot light. Electrical input 120VAC, 50/60Hz – output 140VAC, 10AMP. Variac will be supplied with a 20' long, 1/2" trade size flexible metal conduit.

10. An optional 235cfm exhaust fan will be supplied for greater heat loads. The exhaust fan assembly will be attached to the exterior of the cabinet for maximum pump storage and airflow. The fan assembly shall incorporate a 4" diameter duct collar connection. Connection to the building HVAC exhaust by others.

PART 3 – EXECUTION

3.1 EXAMINATION:

A. Verify rough-ins for mechanical and electrical services for sizes, locations and adequacy; blocking and supports for wall mounted items and floors for compliance with specified tolerances.

3.2 PREPARATION:

A. Condition wood casework to average prevailing humidity conditions in installation areas prior to installing.

3.3 INSTALLATION:

A. General:

1. Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where wood casework abuts other finished work, scribe and cut for accurate fit. Secure with concealed fasteners. Before making cutouts, drill pilot holes at corners.

2. Adjust cabinet top-frame within 1/16" of a single plane.
3. 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.

4. Align similar adjoining doors and drawers to a tolerance of 1/16".

B. Trim and Moldings:

1. Install in single, unjointed lengths for openings and for runs less than maximum length of material available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members. Provide matching fillers and scribe strips as indicated or required to fit cabinet runs to spaces provided.

C. Hardware:

1. Doors and drawers must operate smoothly without warp or bind.

D. Accessories:

1. Securely fasten adjustable shelving supports and pegboards to partition framing, wood blocking, or reinforcements in partitions.

2. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight and closely fitted to other work.

E. Special Purpose Storage Cabinets: Install and setup in strict compliance with manufacturer’s written installation instructions. Adjust leveling feet or other methods to ensure the unit is equally supported around the base on the floor. Install acid cabinet vent kit and coordinate the installation of venting solvent storage cabinet to fume hood exhaust system. Each cabinet shall be vented separately and with sufficient mixing distance so as not to create chemical incompatibility. Materials used for venting must meet an NFPA Flame Spread Rating of 25 or less – including all materials used in connecting the back of the cabinet to the exhaust duct. Materials used for venting must be rigid construction – flexible material will not be permitted. Any solvent cabinet vent opening which has not been vented with vent pipe must have manufacturers’ bungs secured in place. Base cabinets shall be cleaned after installation.

END OF SECTION 12346