

SECTION 12311 - WOOD LABORATORY CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Wood casework
- B. Table frames
- C. Work surfaces
- D. Sinks, drain outlets
- E. Service fittings
- F. Accessory items as specified herein

1.2 RELATED SECTIONS:

- A. Section 06105: Miscellaneous Carpentry
- B. Section 09654: Linoleum Floor Coverings
- C. Section 11610 - Laboratory Fume Hoods.
- D. Division 15: Mechanical
- E. Division 16: Electrical

1.3 CASEWORK DESIGN

- A. Door and Drawer Design: Flush Overlay
 - 1. Square edged flush overlay design with 1/8" reveals between door or drawer and frame, door to door, door to drawer, drawer to drawer; 1/16" vertical reveal between doors/drawers and cabinet ends.
- B. Standard grain pattern on end panels is vertical.
- C. Grain pattern on cabinet fronts: Vertical Matched Grain
 - 1. Continuous vertical grain match on door and drawer fronts of individual cabinets.
- D. Cabinet end panels exposed to view after installation must be specified as a "finished end" panel. All end panels not exposed to view after installation will be as listed under "unexposed" plywood.
- E. Cabinets to be rigid, self-supporting design for use in assembly or as single, interchangeable stand-alone units. Suspended units are without sub-base.
- F. Flush Interiors: Surface mounted bottoms and offsets caused by front face frames, which interfere with ease of cleaning, are not acceptable.
- G. Joinery: 32mm doweled joinery system glued, clamped and screwed. Dowels are to be hardwood, laterally fluted with chamfered ends and a minimum diameter of 8mm.

1.4 SUBMITTALS

- A. Manufacturer's Compliance Statement as included with this specification.
- B. Shop Drawings: Provide large scale plans and elevations of casework, cross sections, rough-in and anchor placements, tolerances and clearances. Indicate relationship of units to windows, doors, surrounding walls and other building components.
- C. Product Data: Submit manufacturer's catalog for reference. Include cabinet dimensions, configurations, construction details, joint details, attachment details, and rough-in details as required.
- D. Product Samples to be submitted for approval 4 each:
 - 1. Finish: 3" x 5" sample of each available standard stain color with finish.

1.5 QUALITY ASSURANCE

- A. Single source: Casework and fume hoods to be manufactured and furnished by a single laboratory furniture company.
- B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled production staff to produce high quality laboratory casework and fume hoods, and shall meet the following minimum requirements:
 - 1. Minimum of ten years experience in manufacture of wood laboratory casework and fume hoods.
 - 2. Ten installations of equal or larger size.
- C. Installer qualifications: Certified by the manufacturer.
- D. Manufacturer to provide load test results certified by an independent testing laboratory for drawers, doors, suspension slides and unit shelving.

1.6 PROJECT CONDITIONS

- A. Do not deliver or install wood product until the following conditions are met:
 - 1. Windows and doors are installed and the building is secure and weather tight.
 - 2. Ceiling, overhead ductwork and lighting are installed.
 - 3. All painting is completed and floor tile is installed.
 - 4. Interior building temperature to be between 65° F and 80° F, and ambient relative humidity maintained between 25% and 55% prior to delivery, and during and after installation. Frequent and/or excessive changes in temperature and/or humidity levels during casework installation, or once casework is installed, must be avoided to prevent damage to materials.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Schedule delivery so rooms are sufficiently complete that material can be installed immediately following delivery.
- B. Casework: Protect finished surfaces from soiling or damage during handling and installation.
- C. Work surfaces: Protect throughout the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Wood Casework:
 - 1. Fisher Hamilton; Product Modular Wood Casework System
 - 2. ACL/Mott

3. Kewaunee Scientific Corp.
4. Mohan International, Inc.
5. Substitutions: See Section 01600 – Product Requirements

- B. Warranty: Provide manufacturer's one year warranty against defects in materials and workmanship.

2.2 CASEWORK MATERIALS

- A. Definition of cabinet components by surface visibility: Reference to locations is made in Section 2.3 when describing surface materials:

1. Exposed Surfaces:
 - a. Surfaces visible when drawers and solid doors are closed.
 - b. Surfaces visible behind clear glass doors.
 - c. Interior surfaces of open units.
 - d. Bottoms of cabinets 42" or more above finished floor.
 - e. Tops of cabinets less than 78" above finished floor, or are visible from an upper floor or staircase after installation.
 - f. Front edges of cabinet body members visible though a gap greater than 1/8" with doors and drawers closed.
 - g. Surfaces visible when fixed appliances are installed.
2. Semi-exposed Surfaces:
 - a. Surfaces visible when doors are open.
 - b. Bottoms of cabinets 30" – 42" above finished floor.
 - c. All front edges of shelving behind doors.
3. Concealed Surfaces:
 - a. Surfaces not normally visible after installation.
 - b. Bottoms of cabinets less than 30" above finished floor.
 - c. Tops of cabinets over 78" above finished floor which are not visible from an upper level.
 - d. Stretchers, blocking, components concealed by drawers.

- B. Hardwood:
1. Hardwood lumber, clean and free of defects. All lumber kiln-dried to uniform moisture content of six percent.
 - a. Exposed material
 1. Red Oak (Plain sawn to match exposed veneer), Grade I minimum
 - b. Semi-exposed material - Select hardwood.
 - c. Unexposed material - Sound hardwood of species suitable for the intended purpose.

- C. Plywood:
1. Core :
 - a. 7-ply (3/4" thick) and 9-ply (1" thick) veneer core plywood with cross and face plies bonded with Type II water-resistant glue; drawers are nine-ply, 1/2" thick.
 - b. 3-ply particleboard core plywood, grade 1-M-2, 45-50 lb. density, 3/4" or 1" thick as specified and drawn. (Shelves, wall case tops and bottoms, and tall case tops are veneer core plywood.)
 2. Face veneer:
 - a. Exposed surfaces
 1. Plain-sliced Rd oak veneer, grade A.
 - b. Semi-exposed: Same species as specified for exposed face veneer, grade 2.
 - c. Unexposed: Same species as specified for exposed and semi-exposed veneer, grade at option of manufacturer.

- D. Welded Fiberboard: Wood fibers and resin binders formed under heat and pressure.

- E. Glass - 7/32" for tall cases and unframed wall and upper case doors, 1/8" for framed wall and upper case doors, without imperfections or marred surfaces of :
1. Clear float glass

- F. Glue: Laminating - Type II water-resistant; assembly - Type III water-resistant.
- G. Edgebanding: 3mm hardwood of same species as exposed face veneers.

2.3 CASEWORK FABRICATION

- A. Base Units:
 - 1. Cabinet ends: 3/4" thick plywood (for both exposed and unexposed ends) with 3mm hardwood banding on front edges. Bore interior faces, as appropriate, for security panels, rails, and four rows of shelf support holes.
 - a. No levelers required - wood shimming approved.
 - b. Provide four metal corner gusset levelers with threaded adjustment screws and floor pad on all base cabinets
 - 2. Top rails:
 - a. Front and Back
 - 1. Horizontal front top rail: 1" x 3" solid hardwood. Attach to cabinet ends with glued 8mm dowel joinery and screws.
 - b. Vertical back top rail: 3/4" x 3-3/4" hardwood. Attach to cabinet ends with glued 8mm dowel joinery and screws.
 - 1. Full Top Frame
 - a. Horizontal front top rail: 1" x 3" solid hardwood. Attach to cabinet ends with glued 8mm dowel joinery and screws.
 - b. Vertical back top rail: 3/4" x 3-3/4" hardwood. Attach to cabinet ends with glued 8mm dowel joinery and screws.
 - c. Top side rails: 3/4" x 1-1/2" hardwood between front horizontal and back vertical rails, glued and screwed in place.
 - 3. Intermediate rails : None Required
 - 4. Toe space rail: 3-3/4" x 3/4" hardwood or 7-ply veneer core plywood, mounted between end panels with glued 8mm dowel joinery and metal fasteners, forming a 4" high x 2-1/2" deep toe space, closed to cupboard bottom.
 - 5. Bottoms: 3/4" thick plywood, set flush and joined to cabinet end panels with glued 8mm dowels on 96mm spacing and metal fasteners. Front edge to be banded with 3mm hardwood banding. Suspended units to be 1" thick. Removable bottoms are not acceptable.
 - 6. Backs:
 - a. Cupboard units: One-piece 3/16" thick hardboard, rabbetted into rear top rail for easy removal from inside of cabinet.
 - b. Drawer units: Removable 3/16" thick hardboard split back panels, rabbetted into top rail.
 - c. Sink units - Half-height, one piece 3/16" thick hardboard, rabbetted into rear rail for easy removal from inside of cabinet.
 - 7. Vertical dividers in combination cabinets: 1-1/2" thick plywood panel glued and screwed in place, top and bottom, with 3mm hardwood banding on front edge.
 - 8. Security panels: None required
 - 9. Shelves (base units);
 - a. 20 gauge cold rolled steel covered with electrostatically applied chemical-resistant urethane powder coat finish, front and back edges formed down and back 3/4" , ends formed down 3/4"; shelves over 36" long include welded hat channel bottom reinforcement full width of shelf. Depth of shelf to be 17-3/4" deep.
 - 10. Drawer construction:
 - a. Box: Four-sided drawer box with back, front and sides of 12mm (1/2" nominal) 9-ply Birch plywood with chemical-resistant finish and finished top edges. Sides shall be joined by llock joint, glued and pinned
 - b. Bottom: nominal 1/4", inset into all four sides of drawer box and sealed with hot melt glue process around entire drawer bottom perimeter. Material to be White coated MDF board
 - c. Divider grooves: None
 - 11. Door and removable drawer front:

- a. 3 ply 3/4" thick particleboard core plywood with 3mm hardwood banding on all four edges
 12. Fillers, kneespace panels, scribes, etc.: Shall be of same species and grade as adjacent exposed surfaces, either 3/4" thick veneer core plywood or lumber as required, with same stain and finish.
 13. Pullboards: 1" thick plywood with balanced laminated faces. Front to be hardwood of same species and same reveals specified for cabinet exterior. Suspension to be 3/4 extension, open roller, 75 lb. dynamic load, self-closing, with hold-open feature and epoxy-coated.
- B. Wall, Upper and Tall cases:
1. Shall be manufactured with appropriate materials and joinery methods as specified for base units except as noted below.
 2. Tops: 1" thick, 9-ply veneer core plywood with 3mm hardwood banding on front edge.
 3. Bottoms:
 - a. Wall and upper case: 1" thick, 9-ply veneer core plywood with 3mm hardwood banding on front edge.
 - b. Tall case: 3/4" thick, 7-ply veneer core plywood with 3mm hardwood banding on front edge. Bottom plywood kick rail 3-3/4" high joined to cabinet sides.
 4. Backs: 1/4" thick veneered plywood with backs recessed 7/8" and set into top, bottom and ends, sealed with hot melt glue process around entire perimeter.
 5. Shelves: veneer core plywood, 3mm hardwood banded on front edge, adjustable on 32mm centers.
 - a. Open and glass door cabinets: 1" thick, 9-ply, for all shelves.
 6. Door construction:
 - a. 3/4" 3 ply thick particleboard core plywood with 3mm hardwood banding on all four edges
 7. Framed glass doors: Solid hardwood, 3/4" x 2-3/4" frame stock machined to accept glass, mitered joints, extruded vinyl retaining molding to allow glass to be replaced without tools.
- C. Hardware:
1. Standard drawer suspension : Full extension with overtravel, ball-bearing roller, 150 lb. dynamic load, zinc-plated Accuride 4034 series or equal. Drawer bodies less than 4" to be furnished with full extension, 100 lb. dynamic load, zinc-plated Accuride 3832 series slides.
 2. File drawer suspension: Full extension with overtravel, ball-bearing roller, 150 lb. dynamic load, zinc-plated Accuride 4034 series or equal.
 3. Drawer and hinged door pulls:
 - a. Wire: Polished Stainless Steel
 1. All pulls are mounted horizontally on drawers, vertically on doors
 4. Hinges: Provide two hinges for doors up to 48" high; three hinges for doors over 48" high. Notch for proper fit.
 - a. Hinges: Institutional type, five knuckle stainless steel projecting barrel hinges, minimum 2-1/2" long, provide two hinges for doors up to 36" high; three hinges for doors over 36" high. Drill each leaf for three stainless steel screw attachment to door and frame
 5. Unit shelf supports: Metal pin and socket.
 6. Locks, where indicated on drawings: 4 pin cylinder and 2 keys per lock
 7. Door catches: Magnetic

2.4 TABLE FRAME

- A. Perimeter Table Frame Rails: 3/4" x 4-5/16" hardwood with attached steel corner braces, grooved and screwed into both rails at each corner. (Bottom rail edges to be radiused.)
- B. Reinforcing Cross Rails: 3/4" veneer core plywood, doweled and glued and pinned into front and back rails, at intervals not more than 33" on center in tables without drawers.
- C. Separate cross rails: 3/4" x 4-5/16" hardwood with attached steel brackets at both ends.
- D. Legs: 2" x 2" hardwood, with 3/8"-16 x 3-1/2" hanger bolt inserted 1-3/4" into leg and fastened to perimeter rail corner brace.

- E. Leg Rails: 3/4" x 4-5/16" hardwood, mortised into legs and secured with 3/8"-16 x 5" stove bolt.
- F. Leg shoes: Black rubber with provision for floor clip.

2.5 SOLVENT (FLAMMABLE) STORAGE

- A. Design and construct in accordance with OSHA regulations, FM, UL and NFPA 30, National Fire Protection Association, Flammable and Combustible Liquids Code. Cabinets shall be Factory Mutual (FM) approved and Underwriters (UL) listed with UL/FM approval label affixed to inside of cabinet door.
- B. Design: Door overlay design, either flush or lipped, and face veneer species, plain-sliced red oak, shall be same as specified for wood laboratory casework.
- C. Cabinet: Bottom, top, back, door(s) and sides of cabinet shall be constructed of 1-inch veneer core plywood. All joints shall be rabbetted and shall be fastened in two directions with wood screws.
- D. Back: Floor mounted and suspended cabinets shall have removable back panels for access to utility chase from inside the cabinet. Floor mounted cabinets with flush top panel shall also incorporate the top panel as removable.
- E. Door: Provide with five-knuckle hinges, manual three-point latch and door sill raised at least two inches above cabinet bottom to retain spilled liquid within the cabinet. When more than one door is used, there shall be an overlap of not less than 5/8".
- F. Ventilation: Cabinet shall include two threaded, two-inch pipe vent outlets and flame arrestors on the back of the cabinet.
- G. Bottom: In addition to cabinet bottom, provide with minimum two-inch deep, lipped, removable, liquid tight, powder coated steel bottom pan.
- H. Shelving: Provide with full width and full depth 3/4-inch thick adjustable shelf.
- I. Identification: All solvent storage cabinets shall be marked with conspicuous, two-inch high lettering: FLAMMABLE - KEEP FIRE AWAY.
- J. Finish: Finish as specified for wood laboratory casework. Exterior color as selected by Architect from manufacturer's standard color selection.

2.6 WOOD FINISH – to be environmentally friendly, water based.

- A. Finish: Highly chemical-resistant modified acrylic urethane finish with built in U.V. blocker or equal finish applied over stain of selected color. Finish must meet performance characteristics of TR-5, Section 1500, AWI Architectural Woodwork Quality Standards (latest edition).
- B. Chemical Resistance Test Procedure: Finished panels shall be oriented horizontally and vertically during exposure to the test chemicals. Chemical concentrations shall be adjusted by the volume method. Ambient temperature and chemical temperature shall be 68-72F. At the end of the test period, the surface shall be washed with detergent and warm water. Areas exposed to solvents shall be cleaned with a cloth dampened with the respective solvent. Prior to evaluation, 16-24 hours after the chemicals have been removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.
- C. Tests:
 - 1. Horizontal Test: Apply 5 drops of the acid, base or salt substance to correspondingly numbered areas of the surface to be tested. Position a 1" diameter watch glass in the liquid,

convex side downward. Solvents shall be applied by saturating a 1" ball of cotton, then covering with an inverted two-ounce wide-mouth bottle. Test duration shall be one hour.

2. Vertical Test: The test surface shall be marked to indicate divisions; 12" high, 3/4" wide, and numbered to identify the chemicals. Five drops of each substance shall be applied to its respective numbered area in a vertical track pattern to prevent crossover. Test duration shall be two hours.

D. Ratings:

1. Excellent: Indicates excellent to superior integrity of finish film. No effect or slight change in gloss and slight discoloration.
2. Good: Allows change of gloss or discoloration or slight swelling while retaining integrity of finish film.
3. Poor: Obvious and significant deterioration, including blistering, pitting, cratering, erosion and/or loss of finish material.

E. Test results (minimum requirements):

	<u>REAGENT</u>	<u>HORIZONTAL TEST RATING</u>	<u>VERTICAL TEST RATING</u>
1.	Nitric Acid, 10%	Excellent	Excellent
2.	Nitric Acid, 25%	Good	Good
3.	Sulfuric Acid, 25%	Excellent	Excellent
4.	Sulfuric Acid, 50%	Good	Excellent
5.	Acetic Acid, 50%	Excellent	Excellent
6.	Acetic Acid, 75%	Good	Excellent
7.	Phosphoric Acid, 50%	Excellent	Excellent
8.	Phosphoric Acid, 75%	Excellent	Excellent
9.	Hydrochloric Acid, 20%	Excellent	Excellent
10.	Hydrochloric Acid, 37%	Good	Excellent
11.	Butyl Alcohol	Excellent	Excellent
12.	Ethyl Alcohol	Excellent	Excellent
13.	Methyl Alcohol	Excellent	Excellent
14.	Ethyl Acetate	Good	Excellent
15.	Ethyl Ether	Good	Excellent
16.	Methyl Ethyl Ketone	Good	Excellent
17.	Toluene	Good	Excellent
18.	Acetone	Good	Excellent
19.	Naphtha	Excellent	Excellent
20.	Xylene	Good	Excellent
21.	Kerosene	Excellent	Excellent
22.	Sodium Hypochlorite, 5.25%	Excellent	Excellent
23.	Sodium Hydroxide, 25%	Excellent	Excellent
24.	Sodium Hydroxide, 35%	Excellent	Excellent
25.	Sodium Hydroxide, 40%	Excellent	Excellent
26.	Sodium Hydroxide, 50%	Excellent	Excellent
27.	Potassium Hydroxide, 40%	Excellent	Good
28.	Potassium Hydroxide, 45%	Excellent	Excellent
29.	Zinc Chloride Saturated	Excellent	Excellent
30.	Sodium Chloride Saturated	Excellent	Excellent
31.	Sodium Carbonate Saturated	Excellent	Excellent
32.	Glycerin	Excellent	Excellent
33.	Hydrogen Peroxide, 30%	Excellent	Excellent

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Casework Installation:
 - 1. Set casework components plumb, square, and straight with no distortion and securely anchored to building structure. Shim as required using concealed shims.
 - 2. Fasten continuous cabinets together with joints flush, tight and uniform, with alignment of adjacent units within 1/16" tolerance.
 - 3. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board. Blocking in wall by rough carpentry, Division 6.
 - 4. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8" between top units.
- B. Work Surface Installation:
 - 1. Where required due to field conditions, scribe or caulk to abutting surfaces.
 - 2. Secure joints in the field, where practicable, in the same manner as in factory, with dowels, adhesive or fasteners recommended by manufacturer.
 - 3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.
- C. Sink Installation: Sinks shall be set in chemical-resistant sealing compound, secured and supported per manufacturer's recommendations.
- D. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations. Turn screws to seat flat; do not drive.

3.2 ADJUSTING

- A. Repair or remove and replace defective work, as directed by (Architect/Owner) upon completion of installation.
- B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.3 CLEANING

- A. Broom clean finished casework, touch up as required.
- B. Clean materials as recommended by manufacturer.

3.4 PROTECTION OF FINISHED WORK

- A. Provide necessary protective measures to prevent damage of casework and equipment from exposure to other construction activity.
- B. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

END OF SECTION 12311

SECTION 12346 - HEAVY-DUTY EQUIPMENT RACK

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Support structures.
- B. Tables frames.
- C. Shelves.
- D. Suspended base cabinets/wall cases.

1.2 RELATED SECTIONS:

- A. Section 12311– Wood Laboratory Casework
- B. Section 12346 – Overhead Service Carrier

1.3 SYSTEM DESIGN REQUIREMENTS

- A. Modular dimensioned system of vertical upright support structures and cantilevered support frames.
- B. Heavy-Duty Support Base with Vertical Uprights:
Support structure for tables, storage units and shelves, and service chase for all cabling.
 - 1. Modular units shall be suitable for wall, peninsula or island configurations.
 - 2. Mobile support frames can be ganged side-to-side and back-to-back.
 - 3. Equipped with swivel casters that have an adjustment knob that lowers a pad and raises the wheel off the ground to prevent rolling.
- C. Tables: Modular, interchangeable work surface support structures in adjustable height configurations.
 - 1. Adjustable height table frames support cantilever configurations.
- D. System Requirements:
 - 1. Independently support work surfaces, undercounter cabinets, and overhead storage components.
 - 2. Structural components are essentially self-supporting and independent of the building structure. Table frames, worksurface supports and horizontal structural cross rails to be all welded construction.
 - 3. Cabinet fastening devices cannot be accidentally released from framing system. Intentional release can be easily accomplished without disturbing the cabinet contents by simply loosening two bolts.
 - 4. Suspended base cabinets can be removed without removal of the work surface and/or shelf.
 - 5. Wall cabinets are adjustable vertically and laterally and can be removed with the use of simple hand tools.
 - 6. Suspended base cabinets can be relocated while fully loaded and installed in any position between table frames.
 - 7. Vertical height of table work surfaces, wall cases and shelves can be adjusted with simple, but positive mechanisms.
 - 8. All work surfaces are reconfigurable by the user or maintenance personnel with removable and height adjustable work surfaces.
 - 9. Storage cabinets can be suspended from both cantilevered table frames and cantilevered shelf frames.
 - 10. Removable lower worksurface shall allow for 24.5" clear usable space below the worksurface within the same plane as the main worksurface for equipment clearance.
 - 11. Overall equipment rack height shall not exceed 7'6" for free access through a standard door frame.

12. Units of all sizes are tested and certified to hold 2600 pounds, plus the rack weight, distributed over four worksurfaces while maintaining full mobility. Unit tested for greater loads as worst case scenarios.
13. All equipments racks shall be ADA compliant.

1.4 SUBMITTALS

- A. Shop Drawings: Provide 3/4"=1'-0" scale elevations of all components, cross sections, rough-in and anchor placements, tolerances and clearances. Provide 1/4"=1'-0" rough-in plan drawings for coordination with trades. Rough in shall show free area.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Laboratory furniture system, overhead service carriers, casework, work surfaces, laboratory equipment, chemical fume hoods and accessories shall be manufactured or furnished by a single laboratory furniture company.
- B. Manufacturer's Qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produced high quality laboratory casework and equipment, and shall meet the following minimum requirements:
 1. Five years or more experience in manufacture of laboratory casework and equipment of type specified.
 2. Ten installations of equal or larger size and requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Schedule delivery of laboratory furniture system so that spaces are sufficiently complete that material can be installed immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation.

1.7 PROJECT CONDITIONS

- A. Do not deliver or install equipment until the following conditions have been met:
 1. Windows and doors are installed and the building is secure and weather tight.
 2. Ceiling, overhead ductwork and lighting are installed.
 3. All painting is completed and floor tile is installed.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Fisher Hamilton: Product Modular Steel Casework System
- B. ALC/Mott: Steel Equipment Racks
- C. See Section 01600 - Product Requirements.

2.2 SUPPORT STRUCTURES

- A. General requirements for equipment rack and cantilevered type support structures:
 1. Riser uprights: 11 gauge rolled steel supplied with two parallel rows of machine treaded welded nuts that accept bolts that positively engage the table and shelf frames.
 2. Frames: Rolled steel, resistance welded. Frame members and tie rail brackets: 11 gauge; corner gussets: 11 gauge.
 3. Bottom shelf rails: 11 gauge cold rolled steel.
 4. Base cover: 18 gauge cold rolled steel.
 5. Slotted adjustment machined into riser upright: punched for one-inch adjustment of components supported off riser upright.
 6. Swivel casters with and adjustment knob that lowers the pad and raised the wheel off the ground to prevent rolling. Castors shall be constructed of a die cast aluminum frame.

Powder coated ivory color finish. Engineering plastic (nylon) wheel. Die-cast aluminum footpad covered with rubber. Forged steel top plate for Flange and Stem fitting. Rated for 2600 lbs.

2.3 WORK SURFACE

- A. Cantilever Table/Shelf Frame:
 - 1. Nominal table frame dimensions:
 - a. Width: As noted on drawings
 - b. Depth: 29".
 - c. Height: 7".
 - 2. Capable of vertical adjustment in one-inch increments.
 - 3. Support arm bracket: Support frame of 11 gauge cold rolled steel that incorporates four mechanically fastened machine bolts that interlock into a machine trended welded lock nut.
 - 4. Cantilever table frame shall provide support channels from which suspended cabinets can be hung and adjusted horizontally.
 - 5. Suspended cabinets shall clear the top support arm for full width applications.
 - 6. Weight capacity:
 - a. Total equipment rack plus 2600 pounds.
 - b. Work surface plus 925 pounds.
 - c. Shelf unit plus 550 pounds.
 - 7. Worksurface and shelf materials shall be available in epoxy resin.

2.4 SHELVES

- A. General Requirements for Shelves:
 - 1. Shelves shall be supported with a fully welded cantilevered frame with separate retaining rods: 11 gauge rolled steel. Capable of suspending wall cases.
 - 2. Shelf brackets: 11 gauge rolled steel.
 - 3. Vertical shelf adjustment: One-inch increments.
 - 4. Depth and weight capacity: 18" = 550 lbs.
- B. Outside Shelf:
 - 1. Nominal dimensions:
 - a. Length: As shown on drawings
 - b. Depth: 18"
 - 2. Shelf shall be capable of being locked into position.
- C. Shelf materials shall be epoxy resin only.

2.5 SUSPENDED BASE CABINETS/WALL CASES

- A. Design requirements, performance requirements, materials, fabrication and hardware shall comply in all respects with the wood casework specifications.
- B. Suspended Cabinet Hardware: Provide a system of steel C-channels and brackets attached to the casework frames, enabling the installation and removal of suspended base cabinets without the use of special tools.
- C. Suspended Wall Case Hardware: Provide a system of steel hanger rails attached to the casework frames, to be vertically adjustable on two inch increments. Installation and removal of suspended wall cases to be accomplished without the use of tools.

2.6 FINISHES

- A. METAL FINISH:
 - 1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pretreat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.

2. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high-grade laboratory furniture quality finish of the following thickness:
 - a. Exterior and interior exposed surfaces: 1.5 mil average and 1.2 mil min.
 - b. Backs of cabinets and other surfaces not exposed to view: 1.0 mil average.

B. CHEMICAL RESISTANCE

1. Test procedure: A finished test panel shall be laid flat and level on a horizontal surface. Chemical spot tests shall be made by applying 10 drops (approximately 0.5cm²) of each reagent identified to the surface to be tested. Each reagent spot shall be open to the atmosphere. Ambient temperature shall be 68°-72° (20-22.2°C). After a test period of one hour, chemicals shall be flushed away with cold water and the surface washed with detergent, warm water at 150°F (65.5°C) and alcohol to remove surface stains. Surface shall be examined under 100 foot candles of illumination.
2. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:
 - a. No Effect: No detectable change of finish film.
 - b. Excellent: Indicates excellent to superior integrity of finish film. Includes no effect or slight change in gloss and slight discoloration.
 - c. Good: Allows change of gloss or discoloration or surface discoloration while retaining integrity of finish film.
 - d. Fair: Objectionable changes in appearance due to slight swelling or change in gloss while retaining integrity of finish film
 - e. Poor: Obvious and significant deterioration, including pitting or erosion of finish material.
3. Test Result
 - a. Concentration by weight (based on Chameleon - CH color):
 - b. Manufacturer to provide "Independent" and "Certified" performance finish test results, for specified finish color with submittal of Compliance Statement.

<u>CHEMICAL</u>	<u>RATING</u>
a. Acetic Acid-Glacial, 98%	Excellent-shadow
b. Formic Acid, 88%	Excellent-shadow
c. Hydrochloric Acid, 37%	No Effect
d. Nitric Acid, 25%	No Effect
e. Nitric Acid, 60%	Excellent-yellowing
f. Phosphoric Acid, 75%	No Effect
g. Sulfuric Acid, 25%	No Effect
h. Sulfuric Acid, 85%	Excellent-shadow
i. Ammonium Hydroxide, 28%	No Effect
j. Sodium Hydroxide, 10%	No Effect
k. Sodium Hydroxide, 25%	No Effect
l. Acetone	Excellent-shadow
m. Sodium Hypochlorite, 5.25%	No Effect
n. Ethyl Acetate	Excellent-shadow
o. Ethyl Alcohol	No Effect
p. Ethyl Ether	Excellent-shadow
q. Formaldehyde, 37%	No Effect
r. Hydrogen Peroxide, 30%	No Effect
s. Methylene Ketone	Excellent-shadow
t. Phenol, 85%	Excellent-shadow
u. Xylene	Excellent-shadow

PART 3 EXECUTION

3.1 INSTALLATION

- A. Furniture system installation:
 - 1. Install system in strict accordance with manufacturer's instructions.
 - 2. Set system components plumb, square, and straight with no distortion and securely anchored to building structure. Shim as required using concealed shims.
- B. Install suspended casework, work surfaces, sinks and accessory items per Section 12311.

3.2 ADJUSTING

- A. Repair or remove and replace defective work, as directed by Architect or Owner upon completion of installation.

3.3 CLEANING

- A. Clean shop finished laboratory furniture system surfaces and touch up as required.

3.04 PROTECTION OF FINISHED WORK

- A. Provide all necessary protective measures to prevent exposure of laboratory furniture system and attached components from exposure to other construction activity.
- B. Advise contractor of procedures and precautions for protection of material, installed laboratory furniture system, casework and fixtures from damage by work of other trades.

END OF SECTION 12346

SECTION 12485 - FOOT GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes recessed foot grilles and frames.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide foot grilles and frames capable of withstanding and supporting a uniform load of 200 pounds per square foot without exceeding the allowable design working stress of the materials involved, including anchors and connections.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of foot grille and frame.
- B. Shop Drawings: Show fabrication, assembly, joint locations, installation details, layout, plans, elevations, full-scale sections, details of patterns or designs, anchors, and accessories for foot grilles and frames.
- C. Samples for Verification: 8-inch- square assembled sections of foot grille, frame members, and tread rails, and tread surface.
- D. Quality Assurance Submittals:
 - 1. Recycled content certification: Manufacturer's or fabricator's certificate indicating percentage of post-consumer recycled content by weight and post-industrial recycled content by weight for each Product specified under this Section.
 - 2. Local/regional source certification: Manufacturer or fabricator's certificate indicating location, and distance in miles from the Project Site, of each Product's final assembly, extraction, harvesting, or recovery prior to shipment to the Project Site.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain foot grilles and frames through one source from a single manufacturer.
- B. Accessibility Requirements: In addition to requirements of authorities having jurisdiction, provide installed foot grilles that comply with Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)"

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify blocked-out openings in floors by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 COORDINATION

- A. Coordinate size and location of oversized recesses in concrete work to receive foot grilles and frames.
 - 1. Defer frame installations until building enclosure is completed and related interior finish work is in progress.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.
 - 1. Finish: Satin.
- B. Stainless-Steel Angles: ASTM A 276 or ASTM A 479, corrosion resistant, Type 304.
 - 1. Finish: Satin.

2.2 FRAMES

- A. Provide manufacturer's standard frames of size and style for grille type, for permanent recessed installation in subfloor, complete with installation anchorages and accessories.
 - 1. Unless otherwise indicated, fabricate frame of same material and finish as grilles.

2.3 FOOT GRILLES

- A. General: Provide manufacturer's standard foot grille assemblies consisting of treads of type and profile indicated, joined together by cross members or interlocked, and with support legs (if any) and other components needed to produce a complete installation.
- B. Stainless-Steel Foot Grille Type 1:
 - 1. Surface Treads: 0.071-by-0.177-inch wire with 0.125-inch- wide slot openings between wires.
 - 2. Support rods: Spaced 1 inch on center, welded to each wire.
 - 3. Mat grating: 5/8 inch deep.
 - 4. Lockdown: Hidden.
 - 5. Frame: Stainless-steel angle.
 - 6. Products: Subject to compliance with requirements, provide the following:
 - a. Kadee Industries, Inc.: Model KD58.

2.4 FABRICATION

- A. Shop fabricate foot grilles to greatest extent possible in sizes as indicated.
 - 1. If not otherwise indicated, provide each grille as a single unit; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning.
 - 2. Where joints in grilles are necessary, space symmetrically and away from normal traffic lanes.
- B. Fabricate frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, floor conditions, and floor recesses for compliance with requirements for location, size, and minimum recess depth, and other conditions affecting installation of foot grilles and frames.
- B. Examine roughing-in for drainage piping systems to verify actual locations of piping connections before foot grille and frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install recessed foot grilles and frames to comply with manufacturer's written instructions at locations indicated and with top of foot grilles and frames in relationship to one another and to adjoining finished flooring as recommended by manufacturer.
 - 1. Set foot grille tops at height for most effective cleaning action.
 - 2. Coordinate top of foot grille surfaces with doors that swing across grilles to provide clearance under door.

3.3 PROTECTION

- A. After completing frame installations, provide temporary filler of plywood or fiberboard in foot grille recesses and cover frames with plywood protective flooring.
 - 1. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 12485