

**SECTION 12 35 53.21**  
**MOVEABLE BENCH LABORATORY CASEWORK**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies factory-fabricated, modular wood veneer casework, as detailed on the Drawings, including related components and accessories required to form integral units and metal table frame system, adjustable and with services. Wood casework items shown on the Drawings, but not specified below shall be included as part of the work under this Section, and applicable portions of the specification shall apply to these items. Each like item of casework shall be of the same design and by one manufacturer.

**1.2 RELATED WORK**

- A. Custom fabricated plastic laminate, phenolic, and wood casework; and non-acid-resistant, plastic laminate counter tops: Section 06 20 00, FINISH CARPENTRY.
- B. Acid-resistant laminate and epoxy resin countertops with integral sinks and accessories: SECTION 12 36 00, COUNTERTOPS

**1.3 MANUFACTURER'S QUALIFICATIONS**

Fabrication of casework shall be by a manufacturer who produces casework similar to the casework specified and shown.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:  
Locks for doors and drawers  
Adhesive cements
- C. Samples:  
Wood Face Veneer or Hardwood Plywood  
Steel Umbilical Chases
- D. Shop Drawings (1/2 full size):
1. Casework, showing details of construction, including materials, hardware and accessories.
  2. Cabinets and counters showing faucets in connection with sink bowls, and electrical fixtures and receptacles which are mounted on cabinets and counters.
  3. Fastenings and method of installation.

- E. Mock-Up: Where required for special casework and where four or more similar units are involved, submit a mock-up of a typical unit for approval by Resident Engineer.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):  
A167-99 (R2004) .....Stainless and Heat-Resisting chromium-Nickel  
Steel Plate, Sheet and Strip  
A1008-07 .....Steel, Sheet, Cold-Rolled, Carbon, Structural,  
High Strength Low Alloy  
C1036-06 .....Flat Glass
- C. Composite Panel Association (CPA):  
A208.1-99 .....Particleboard
- D. U.S. Department of Commerce Product Standards (Prod. Std):  
PS1-95 .....Construction and Industrial Plywood
- E. Hardwood, Plywood and Veneer Association (HPVA):  
HP.1-04 .....Hardwood and Decorative Plywood
- F. Architectural Woodwork Institute (AWI):  
Architectural Woodwork Quality Standards, Guide Specifications 1999
- G. American Society of Mechanical Engineers (ASME):  
A112.18.1-05 .....Plumbing Fixture Fittings
- H. National Electrical Manufacturers Association (NEMA):  
LD3-05 .....High Pressure Decorative Laminates  
LD3.1-95 .....Performance, Application Fabrication, and  
Installations of High-Pressure Decorative  
Laminates
- I. Hardwood Plywood and Veneer Association  
HP-1 .....Hardwood and Decorative Plywood

#### **PART 2 - PRODUCTS**

##### **2.1 PLYWOOD, HARDWOOD FACE VENEER**

HPVA HP-1, Premium Grade plain sliced natural maple to match that specified in Section 062000.

##### **2.2 PLYWOOD, SOFTWOOD**

Prod. Std. PS1, five ply construction from 13 mm to 28 mm (1/2 inch to 1-1/8 inch) thickness, and seven ply for 31 mm (1 1/4 inch) thickness.

**2.3 PARTICLEBOARD**

CPA A208.1, Type 1, Grade 1-M-3.

**2.4 GLASS: ASTM C 1048**

For Doors: Fully Tempered, Type I, Quality q3.

**2.5 SOLID WOOD**

Wood required for edge banding moldings and legs shall be of same species as wood face veneer.

**2.6 SHEET STEEL**

ASTM A1008.

**2.7 HARDWARE**

A. Where pin tumbler locks are indicated, provide disc tumbler lock with brass working parts and case, "Duo A" as manufactured by Illinois Lock Company or acceptable substitute. Locks for each type casework, shall be keyed differently and shall be master-keyed for each type service. Provide two keys for each lock. Exposed hardware, except as otherwise indicated, shall be satin finished chromium plated brass or nickel plated brass.

B. Marking of Locks and Keys:

1. Name of the manufacturer, or trademark by which manufacturer can readily be identified, legibly marked on each lock.
2. Key change number marked on the exposed face of lock, and also stamped on each key.
3. Key change numbers shall provide sufficient information for replacement of the key by the manufacturer.

C. Hinged Doors:

1. Doors 900 mm (36 inches) and more in height shall have three hinges and doors less than 900 mm (36 inches) in height shall have two hinges. Each door shall close against two rubber bumpers.
2. Hinges: Fabricate hinges with minimum 2 mm (0.072 inch) thick stainless steel leaves, and with minimum 3.5 mm (0.139 inch) diameter stainless steel pin. Hinges shall be five knuckle design with 63 mm (2-1/2 inch) high leaves and hospital type tips.
3. Fasteners: Provide full thread wood screws to fasten hinge leaves to door and cabinet frame. Finish screws to match finish of hinges.

D. Door Catches:

1. Roller type, fabricated with metal housing.
2. Provide one catch for cabinet doors 1200 mm (48 inches) high and under, and two for doors over 1200 mm (48 inches) high.

E. Locks:

1. Cylinder type pin tumbler.
2. Equip doors and drawers where shown with locks.

F. Drawer and Door Pulls: Doors and drawers shall have surface mounted, nominal 3-1/2" long, extruded aluminum pulls; B02011.

G. Drawer Slides: Comply with BHMA A156.9 heavy duty and BIFMA Desk Products X5.5-1989 requirements.

1. Three-quarter extension steel slides with nylon ball-bearing rollers.
2. Slides shall have positive stop.
3. Equip drawers with rubber bumpers.
4. Capacity: Provide slides with minimum load capacity according to the following formula: Minimum Load = (Drawer Depth x Drawer Height x Drawer Width x 0.017 lbs. per cubic inch) + Empty Drawer Weight (approximately 30 lbs.).

H. Shelf Standards (Except For Fixed Shelves): Bright zinc-plated steel for recessed mounting with screws, 16 mm (5/8 inch) wide by 5 mm (3/16 inch) high providing 13 mm (1/2 inch) adjustment, complete with shelf supports.

I. Keyboard Tray: Capable of being attached to underside of work surface; 4 inch keyboard drop; mouse tray slides right or left; black color; 10-1/2 inches by 20 inches.

J. Grommet: Manufacturer's standard item, 2 inch diameter.

## **2.8 FABRICATION - GENERAL**

A. Casework shall be of the flush overlay design and, except as otherwise indicated, be of premium grade construction and of component thickness in conformance with AWI Quality Standards. Provide continuous vertical figure across doors and drawer fronts.

B. Fabricate casework of factory finished wood veneer as follows:

1. Where shown, doors, drawers, shelves, and semi-concealed surfaces shall be factory finished wood veneer.
2. Glazed doors shall have 5 mm (3/16 inch) thick glass, set in glazing compound.
3. Fabricate doors and drawer fronts with grain that runs vertically from doors to drawers.

C. Electrical fixtures, receptacles, wiring and junction boxes required for fixtures and receptacles:

1. Factory installed in casework.

2. For electrical lighting fixtures, see Drawings.
  3. For electric receptacles and lighting fixtures installed below or adjacent to wall cabinets or above counter tops, see Drawings.
  4. Install wiring in built-in raceways and terminate at junction box mounted on rear of cabinet and counter.
- D. Cabinet Tops: Acid resistant plastic laminate.
- E. Drawer Fabrication: Do not use veneer core plywood for doors for any grade of work.
1. Drawer Fronts: 3/4" thick or thicker as required by referenced AWI quality standard; particleboard with wood veneer and hardwood edge banding. Fabricate drawer front separate from drawer body.
  2. Drawer Sides, Backs, and Subfronts: Glue and pin nail joints using lock shoulder detail. Alternatively, use dovetailed or doweled joints glued under pressure as is appropriate for drawer material under AWI guidelines. Space dowels, if used, at 32mm on center maximum to 4" high, 64mm o.c. above 4" high.
    - a. Thickness: Minimum 1/2" thick.
    - b. Permitted: Single species solid lumber with an AWI Section 100-G-1 hardness rating of Medium or better or 7-ply all hardwood veneer core plywood, no voids (minimum 12.7 mm [1/2"] thickness); No edge band required.
    - c. Not Permitted: Medium density fiberboard or raw particleboard sides, dovetail drawer box construction with particleboard substrates clad with thermoset decorative overlay (melamine), square shoulder details, or drawers with joinery using biscuits.
  3. Drawer Bottoms: Fabricate drawer bottoms from minimum 1/4 inch thick hardboard with melamine interior. Set drawer bottoms into all 4 sides, 1/4" deep with minimum 3/8" standing shoulder. "Plant on" bottoms will not be permitted.

## **2.9 WORK SURFACE TABLE FRAMES**

- A. Work Surface Support Frame: 2" outside diameter wall and 1.75" inner telescoping leg, 11 gauge cold rolled steel; ASTM A513 type 1, 1010-1018 tubing. Provide 3/8" - 16 nc by 2.5" long levelers. Provide chemical resistant, urethane powder paint.
- B. Work Surface Table Frame:
1. Nominal table frame dimensions:
    - a. Width: As shown on Drawings.

- b. Depth: 30" (27" projecting in front of the uprights and 1" behind uprights).
- c. Adjustable Height: 29" to 37" AFF including 0.75" thick top
- 2. Front upright member shall be 2" outside diameter, 11 gage wall tubing with telescoping 11 gage inner leg. Provide upright capable of vertical adjustment in two-inch increments.
- 3. Work surface frames shall be made from 11 gage formed steel. Rear corners shall have 2.25" diameter X 6" high 11 gage collar. Weld front half of collar to work surface frame with supporting gussets and fasten back half mechanically to rear uprights with socket head button cap and bolt.
- 4. Locate back stop angle, with full length bumper, under work surface frame to position 24" deep mobile base cabinet 1" behind front edge of work surface.

#### **2.10 REAR FRAME SUPPORT STRUCTURE**

##### **A. General Requirements for Rear Frame Support Structures:**

- 1. Vertical uprights shall allow for plumbing, electrical and data cabling
- 2. Single frame uprights shall be 11 gage tubular steel 2" outside diameter. Gas piping and high/low voltage cabling shall be separated in opposite and separate vertical members.
- 3. Shared rear frame upright shall be 11 gage cold-rolled steel formed to a 2" by 6" structural support with a full-height removal side cover. Gas piping shall be in opposite and separate vertical upright from cabling. Cabled vertical upright shall have two channels to separate low voltage from high voltage cabling.
- 4. Levelers shall be 3/8" - 16 nc by 2.5" long. Provide one leveler per single frame upright, 2 levelers per shared frame upright.
- 5. Single and shared rear frames in 60, 72, 96 inch widths shall have a center support to accommodate split shelving.
- 6. Uprights have slots punched on 1" increments starting at nominal 55" above floor to top of upright.
- 7. Upper and lower horizontal cross rails shall be 11 gauge steel for single frames and 14 gauge for shared frames.
- 8. Lower structural cross rail for single frame shall house an integral two-channel raceway. Structural cross rails for shared frames shall incorporate an enclosed raceway with removable bottom cover for electrical wiring and 20 amp duplex outlets.

9. Raceways for single rear frames to have 2 -20 amp hospital grade duplexes (NEMA 5-20R) on 42" and 48" units, 3 - 20 amp hospital grade duplexes (NEMA 5-20R) on 60", 72" and 96" wide units. All single rear frames to have one -20 amp duplex located in vertical upright under work surface.
  10. Raceways for shared rear frames to have 2 per side - 20 amp hospital grade duplexes (NEMA 5-20R) on horizontal raceway on 42" and 48" wide frames and 3 per side on 60", 72" and 96" wide frames. All shared rear frames to have two -20 amp duplexes located in vertical upright under work surface; each duplex is on a separate circuit.
  11. Rear frames shall have three-prong or four-prong twist lock plug ends in locations and quantities as shown on Drawings.
  12. Power and data for study carrels shall be fed from exterior walls adjacent to work surfaces under Division 26. For Study Carrels, provide 6' pig tails with NEMA 5-20P plugs in replacement of the upper receptacle of the duplex beneath the work surface to connect carrels to wall outlets.
  13. Frame assemblies shall have cabled vertical uprights with CAT 6 phones, CAT 6 data cables, and blanks connecting to separate 2-port receptacle frames in locations and quantities as shown on Drawings. Provide (6) Cat 6 cables (for phone/data) with male plug-in RJ45 terminations extending 4'-0" above upright. Cables shall be red, white and blue to match VA standard. Color for the RJ45 Cat 6 Female terminations at the outlet shall match the cable.
  14. Provide 2-port receptacle frames with separate ANSI/TIA/EIA - 568-A data and voice compliant female components.
    - a. Locate one 2-port receptacle in horizontal raceway of single rear frames.
    - b. Locate two 2-port receptacles in upright of shared rear frames above the work surface.
  15. Nominal dimensions:
    - a. Width: As shown on Drawings.
    - b. Height: 84".
- B. Wall Frame Support Structures:
1. Wall frames shall have same general requirements as rear frame in performance and construction.

2. Wall frames shall be created by removing work surface table frame and mounting existing rear frame directly to wall structure by mechanically fastening top horizontal support rail.

3. Nominal dimensions:

a. Width: As shown on Drawings.

b. Height: 84"

C. Wall Standards:

1. Wall standard shall mount directly to interior wall where wall-mounted shelves are indicated.

2. Wall standards shall have same general requirements, profile and performance requirements as frame assemblies.

3. Provide two wall standards for each shelf assembly.

#### **2.11 PLUMBING/FIXTURES**

A. Upright frame structure shall house a minimum of three plumbing services.

B. Needle Valves: Chromed brass straight pattern instrumentation needle with serrated hose end.

C. Plumbing lines - Single frame: Copper tubing (1/4" for laboratory air services and 3/8" for vacuum services) with hard coupling attached to tube with compression fittings at top of upright. Each half of hard coupling (coupler and nipple) is valved.

D. Plumbing lines - Shared frame: Polyethylene tubing (3/8" for laboratory air services and 1/2" for vacuum services) with tube-to-tube union attached to tube with compression fittings at top of upright.

E. Arrange plumbing lines with hard couplings so services cannot be intermixed.

F. Service valves and tube to tube union shall be media keyed and color coded. Keyed media connects cannot be accidentally be switched.

G. Burning gases tubing (3/8") shall be #316 stainless steel.

#### **2.12 SERVICE CONNECTIONS**

A. Services (plumbing, power, phone and data) shall terminate at top of plumbing and upright support.

B. Power services shall have a 20 amp cord plug extending 4'-0" above top of upright. Plug end shall be twist lock on single rear frame and shared rear frame.

C. Provide CAT 6 phone line with a male plug-in extending 4'-0" above upright.



- D. Provide (6) Cat 6 cables (for phone/data) with male plug-in RJ45 terminations extending 4'-0" above upright. Cables shall be red, white and blue to match VA standard. Color for the RJ45 Cat 6 Female terminations at the outlet shall match the cable.
- E. Provide 4'-0" long gas, air, and vacuum tubing running from top of 7'-0" tall table frames to 9'-0" ceiling. Provide for 2'-0" of slack for bundling and looping inside perforated metal enclosure.

#### **2.13 CEILING MANIFOLD SYSTEM**

- A. Ceiling manifold panel (ceiling service panel) shall integrate within indicated acoustical suspended ceiling systems.
- B. Utility panel shall provide a means to mount and connect electrical outlets, data outlets and service fixtures.
- C. Utility panels shall accommodate single sided and back-to-back bench configurations.
- D. Utility panels shall ship with junction boxes factory attached. Electrical outlets, data outlets, cover plates and service fixtures shall be factory assembled and field installed as one unit.
- E. Utility panel shall be minimum 18-gauge cold rolled steel with a white urethane powder coat finish.
- F. Nominal Dimensions:
  - 1. Sizes: 24" by 24" and 18" by 24" in locations as shown on Drawings.
  - 2. Height (including junction boxes): 3"
- G. Equip ceiling service panel system with hard coupling fitting for service tube ends. Each keyed disconnect shall include nipple and coupler with color-keyed band marking media.
- H. Service Lines: Polyurethane for non-burning gases and braided stainless steel for burning gases shall attach to tube-to-tube unions from ceiling utility panel and rear frame disconnects.
- I. Cable Management Enclosure: Provide removable perforated metal enclosure cable management system designed to conceal utilities as shown on Drawings.

#### **2.14 SHELVES**

- A. General Requirements for Shelves:
  - 1. Shelves supports shall be powder coated cold rolled steel.
  - 2. Shelf platforms shall be wood veneer with 3mm wood edge banding.
  - 3. Shelves shall overhang 2" behind face of vertical tubular support.
  - 4. Shelf brackets: 11 gauge cold rolled powder coated steel. Provide undermount bracket at top shelves.

5. Vertical shelf adjustment: One-inch increments.
6. Shelves shall incorporate a reversible shelf retainer lip that is capable of being positioned in raised or flush position. Shelf lips shall be capable of being repositioned with use of simple hand tools.
7. Shelves shall be capable of being mounted to wall frames, wall standards, and rear frames.

B. Outside Shelf:

1. Nominal dimensions:
  - a. Widths: As shown on Drawings.
  - b. Depths: 12" and 15" in locations as shown on Drawings.
2. Shelf brackets shall rise above shelf surface to provide sides.

C. Shelf Types: Wood shelf with steel (cold rolled) frame; wood shelf shall be 1" thick with 3mm hardwood banding.

D. Shelf Retainers: Lower and middle shelves shall have a removable and reversible rear 1" solid hardwood lip which can act as a stop and can turn upside down to provide a flush surface when units are back-to-back.

**2.15 MOBILE BASE CABINETS**

- A. Cabinets with casters shall be constructed without toe spaces. Cabinet shall be constructed with a reinforced base capable of supporting a 4" high caster assembly in each corner. Casters shall be swivel locking type and rated for minimum 250 pounds load each. Cabinets with casters shall be completely finished on four sides and top since surfaces are considered visible.
- B. Entire cabinet assembly shall be reinforced to permit mobility without twisting and achieve an industry standard height of 31" or 37" including flush 1" counter top.
- C. Base cabinets shall, except as noted, incorporate a flush overlay design in which cabinet body is completely concealed.
- D. Units with drawers shall be equipped with an anti-tipping mechanism that shall include an interlock so that only one drawer in a vertical stack can be opened at one time.

**2.16 FINISHES**

A. Metal Finish:

1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat 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: Liquid, dipped, solvent based finishes are not and will not be acceptable.
  - 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: 1.2 mil average.
- B. Cabinet Surface Finish Tests: Casework construction and performance characteristics shall be in full compliance with SEFA 8 standards.

#### **2.17 TASK LIGHTS**

- A. Task light shall be a T5 type. Task lights shall be gangable with an integral on/off switch. Master light switch shall turn on/off lights ganged to it.
- B. Task light minimum performance levels shall be as follows: with 30 foot candle room lighting at work surfaces, task light shall increase work surface illumination to 80/100 foot candles.
- C. Nominal dimensions: Unit width less 2 inches.
- D. Color to be white.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Set casework in place; level, plumb and accurately scribe and secure to walls, and/or floors.
- B. Installation shall be complete including trim and hardware. Leave the casework clean and free from defects.

#### **3.2 FASTENINGS**

- A. Fastenings for securing casework to adjoining construction shall be as detailed on the Drawings or approved shop drawings.
- B. See Section 05 50 00, METAL FABRICATIONS for reinforcement of walls and partitions for casework anchorage.

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