

**COLLEGE OF CHEMISTRY (herein called "CChem" or "owner")
UNIVERSITY OF CALIFORNIA, BERKELEY
LABORATORY CASEWORK SPECIFICATION
Rev. 9/14/04**

PART 1 GENERAL

1.01 CASEWORK DESIGN

- A. Door and Drawer Design: LIPPED OVERLAY. Radius edged partial overlay design with 3/8" reveals between door or drawer and frame, door to door, door to drawer, drawer to drawer; 7/16" vertical reveal between doors/drawers and cabinet ends.
- B. Standard grain pattern on end panels is vertical.
- C. Grain pattern on cabinet fronts: COMBINATION GRAIN. Horizontal grain on drawer fronts, vertical grain on door fronts.
- 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. ***Or approved alternative.***

1.02 SUBMITTALS

- A. 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. Fabrication should not commence prior to CChem-approved shop drawings. Shop drawings to be submitted as scheduled by CChem or "owner's rep". Any deviation from the specification, including any listed alternatives below, must be clearly identified as such on shop drawings.
- 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 (1 each):
 - 1. Worktop: 4" x 4" sample of each material.
 - 2. Finish: 3" x 5" sample of each available standard stain color with finish.
 - 3. Hardware: Pulls, locks and hinges.

1.03 QUALITY ASSURANCE (Submit with bid documents.)

- A. Manufacturer's qualifications:

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. Manufacturer to be fully responsible for quality of installation.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Schedule delivery so rooms are sufficiently complete that material can be installed immediately following delivery. Delivery schedule to be coordinated with University of California Project Manager or general contractor (as defined in contract) to ensure that there are no project delays.
- B. Casework: Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.
- C. Work surfaces: Protect all work surfaces throughout the construction period with 1/4" minimum corrugated cardboard completely covering the top and securely taped to the edges. Mark cardboard in large lettering, "No Standing".
- D. Protect all existing building surfaces while transporting materials, including but not limited to elevators and corridors.
- E. There is to be no casework modification (e.g., cutting, etc.) outside of the designated work area. Any exceptions to this policy must be approved in advance by the CChem Director of Engineering or Building Manager.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Design, materials, construction and finish of casework as specified represents the minimum acceptable standard of quality for wood laboratory casework.
- B. Warranty: Provide manufacturer's one year warranty against defects in materials and workmanship.

2.02 CASEWORK MATERIALS

- A. Definition of cabinet components by surface visibility:
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:
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: 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
 - 2. Face veneer:
 - a. Exposed surfaces:
Plain-sliced Northern red oak veneer, grade A, selected for golden wheat color and narrow hearts of no more than 5". No split hearts are allowed. Appalachian and Southern red oak veneers are not allowed. Book matched only.
 - b. Semi-exposed: Same species as specified for exposed face veneer, grade 2. Birch, poplar or other hardwoods or softwoods are not acceptable.
 - c. Unexposed: Same species as specified for exposed and semi-exposed veneer, grade at option of manufacturer. Birch, poplar or other hardwoods or softwoods are not acceptable.
- D. Welded fiberboard: Wood fibers and resin binders formed under heat and pressure.
- E. Glass - 7/32" (6mm) for tall cases and unframed wall and upper case doors, 1/8" (3mm) for framed wall and upper case doors, without imperfections or marred surfaces of laminated safety glass (6mm in all locations)
- F. Glue: Laminating - Type II water-resistant; assembly - Type III water-resistant.
- G. Edgebanding: 3mm hardwood of same species as exposed face veneers.
- H. 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).

- I. Work Surface: Work surface to be 1" thick black, solid epoxy resin with 4" high field applied back splash. Field applied 4" high backsplash installed tightly around all support posts penetrating the work surface.
- J. Sinks and Cup Sinks: Drop in sinks and cup sinks to be constructed of solid epoxy resin. Cup sinks and sinks to be supplied with stainless steel strainers.

Panel-mounted mixing faucets at each sink location with color coded plastic index disk (see color code below). Panel-mounted mixing faucet with swing vacuum breaker gooseneck. WaterSaver Faucet Co. L212VP **or approved equal**. Each bench sink to have pegboard constructed of black epoxy resin pegboards with polypropylene pegs.

Panel-mounted distilled water faucet at each sink location. Distilled faucet to be panel-mounted tin-lined water faucet with swing vacuum breaker gooseneck; not self-closing. WaterSaver Faucet co. **or approved equal**.

Faucets (including distilled water) to have 4" blade handles when specified as ADA.

- K. Unless indicated otherwise on construction drawings, casework vendor to supply lab utility valves for casework as shown on design documents. Utility valves along benches to be angle valves with outlets pointed downward and equipped with color coded plastic index disk. Utilities may include: O2, CA, GAS, VAC, N2 & ICW; fixtures to be manufactured by WaterSaver **or approved equal**. Utilities to be as specified in design documents.

COLOR CODING:

O2	light green
CA	orange
GAS	dark blue
VAC	yellow
N2	brown
ICW	dark green
IHW	red
DW	white

- L. Unless indicated otherwise on construction drawings, casework vendor to supply metal fabrication (Unistrut, B-Line or approved equal) structure for casework support. Reference CChem metal fabrication specification.

2.03 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. No levelers required - wood shimming approved
 - 2. Top rails: 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. 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.
 4. 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.
 5. 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.
 6. Vertical dividers in combination cabinets: 1-1/2" thick plywood panel (frames not permitted) glued and screwed in place, top and bottom, with 3mm hardwood banding on front edge.
 7. Shelves (base units): Veneer core plywood, 3 mm hardwood banded on front edge, adjustable on 32mm centers:
 - a. Depth: Full-depth shelf, 17-3/4" deep
 - b. Thickness: 3/4" thick for all shelves up to and including 30" wide, 1" thick for all shelves over 30" wide.
 8. 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. (Three-sided drawer box attached to outer drawer front is not acceptable.) Sides shall be joined by lock 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 tempered hardboard, smooth side up.
 9. Door and removable drawer front construction: 3 ply 3/4" thick (door) and 1/2" thick (drawer), particleboard core, hardwood framed all four sides, face veneer on both surfaces, radiused edges all four sides; doors to be routed on inside perimeter to allow 1/4" inset into door opening.
 10. 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.
 11. 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. Solid door cabinets: 3/4" thick, 7-ply, for all shelves up to and including 30" wide, 1" thick for all shelves over 30" wide.
 - b. Open and glass door cabinets: 1" thick, 9-ply, for all shelves.
6. Door construction: 3/4" 3 ply (door) thick and 1/2" (drawer) thick, particleboard core, hardwood framed all four sides, face veneer on both surfaces, radiused edges all four sides; doors to be routed on inside perimeter to allow 1/4" inset into door opening.
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. With lipped overlay, meeting edges of pairs of doors to include overlapping astragals: right over left.
8. Unframed sliding glass doors: Glass as specified with edges ground, set in extruded aluminum shoe with integral pulls, nylon wheel assemblies and top and bottom extruded aluminum track. Provide rubber bumpers at fully opened and closed door position.

C. Hardware:

1. Standard drawer suspension: Full extension, ball-bearing roller, 100 lb. dynamic load, zinc-plated Accuride 3832 series or equal on all drawers except file drawers.
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: Wire; stainless steel. All pulls are mounted horizontally on drawers and 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. If Hettich hinge is used, provide two hinges for doors up to 36", three hinges for doors 36" – 63" and four hinges for doors over 63" up to 78-3/4": 5-knuckle,

institutional style, hospital tipped, steel; stainless steel.

5. Unit shelf supports: Metal pin and socket.
6. Door catches: Adjustable, spring-actuated nylon roller.
7. Elbow catches: Spring type with strike.

2.04 WOOD FINISH – water based.

A. Chemical Resistance Test Procedure: Horizontal and vertical tests should be conducted. Test procedures and results to be provided to owner. Test result minimum requirements are listed below with ratings definition:

B. Ratings Definitions:

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.

D. 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

2.05 SHELVING

- A. Furnish adjustable wall and reagent shelves as detailed in the drawings and as specified herein.
1. Shelves: 15" deep, 1" thick chemical resistant plastic laminate shelving.
 2. Standards: Meet requirements of CChem Metal Channel Casework Support System specifications. Standards to be spaced 40" apart maximum distance.
 3. Brackets: Meet requirements of CChem Metal Channel Casework Support System specifications.
 4. Earthquake Bracing: Meet requirements of CChem Metal Channel Casework Support System specifications.

PART 3 - EXECUTION

3.01 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.
 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. Work surface to be 1" thick black, solid epoxy resin. Four inch curbs to be installed tight around all metal framing posts that penetrate the work surface. All joints to be sealed leak-tight.
 2. Where required due to field conditions, scribe or caulk to abutting surfaces.
 3. Secure joints in the field, where practicable, in the same manner as in factory, with adhesive recommended by manufacturer.

- 4. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.
- C. Sink installation: Sinks and cup sinks to be constructed of solid epoxy resin; sizes as shown on design documents. 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.

3.02 ADJUSTING

- A. Repair or remove and replace defective work, as directed by owner or owner's rep. upon completion of installation.
- B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.03 CLEANING

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

3.04 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