SECTION 11600

LABORATORY CASEWORK AND EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Related Sections:

1. 06400 - Architectural Woodwork.
2. 07900 - Joint Sealers.
3. 09660 - Resilient Tile Flooring.
4. 11605 - Laboratory Student Centers.
5. 15440 - Plumbing Fixtures, Trim, and Supports.
6. 15891 - Fume Hood Exhaust Ducts.
7. Division 15 and 16 as applicable.

1.02 REFERENCES

A. American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE): ANSI/ASHRAE 110-85.

B. National Fire Protection Association (NFPA): NFPA 45 - Standard on Fire Protection for Laboratories Using Chemicals.

C. Scientific Apparatus Makers Association (SAMA): LF10-80.

1.03 SYSTEM DESCRIPTION

A. Source Quality Control:

1. Built-ins and casework shall be constructed and installed to carry intended loads, not have sharp corners, splinters, or any construction features or projections that would be hazardous to occupants and users. Casework and cabinets shall be constructed in conformance with applicable state and federal accessibility requirements.
2. Conduit and piping shall be concealed when cabinet doors are in an open or closed position. Provide access panels as required for maintenance.
3. Provide casework, fittings, and laboratory fume hoods for integration with laboratory furniture, tops, sinks, and service fixtures, as required, manufactured, or furnished by one company for single responsibility.
4. Use tamperproof fasteners and fittings on equipment and products specified.

5. Use vandal resistant vacuum breaker fittings on water or water related items.

B. Reference Standards:

1. Manufacturer's catalog numbers as shown on Drawings for convenience in identifying fume hoods.
2. Unless modified by notation on drawings or otherwise specified, catalog description for indicated number constitutes requirements for each such unit.

C. Design Criteria:

1. Design fume hoods, connected to exhaust system, to provide proper exhaust volume under normal laboratory conditions. Fume hoods shall operate safely and efficiently, within acceptable tolerances for face velocities specified.

2. When emergency exhaust fans are turned on, the fume hood exhaust fan shall remain in operation and the fume hood supply fan shall automatically shut down.

   a. Include laboratory hood exhaust fans in the air change rate calculation when emergency exhaust fans are turned on and the laboratory hood supply air fans automatically shutdown.

3. Dead air pockets and reverse air currents are not allowed along surface of hood interiors.
4. Exhaust and supply system shall be roof mounted with vertical discharge stack on exhaust blower.

1.04 SUBMITTALS

A. Submit complete shop drawings including properly identified product data for review on all items before fabrication. Give unit performance data, dimensions, materials and finish specifications, hardware accessories, mechanical and electrical stub-out data and locations, installation details, and installation directions.

B. Equipment and furniture shall be the product of manufacturers engaged in the manufacture of this type of equipment and furniture for not less than 5 consecutive years.

1. Manufacturers and distributors shall submit evidence of having completed installations of equal magnitude.

C. Submit the following samples, if requested by A/E, for review according to Construction Documents:

1. One full size upper cabinet unit, showing construction details, with one end finished and the other end unfinished.
2. Provide sample of top and furniture front materials.
3. Finish color samples for selection and review.
4. Pulls, hinges, shelf, and drawer hardware.

D. Submit certified test reports by an independent commercial testing laboratory acceptable to both A/E and the Board certifying performance results of materials and equipment and testing procedures for following:

1. Safety Cabinets.
2. Fume Hoods.
3. Instructor's Demonstration Center.
4. Utility Tables.
5. Worktops:

    a. Laboratory grade laminate top.
    b. Solid epoxy resin top.

6. Acid Storage Cabinets, freestanding or undercounter.
7. Explosion Proof Refrigerators
8. Flammable Storage Cabinets.
9. Fixtures and Fittings:

    a. Plumbing:

        1) Each type of sink and cup drains.
        2) Sink faucets and gas cocks.
        3) Wall sink assemblies.
        4) Vandal resistant vacuum breakers and aerators.

    b. Mechanical service fittings.
    c. Electrical Components and Ground Fault Interrupter (GFI).

E. Provide maintenance manuals for work tops, fume hoods, and mechanical and electrical items at completion of work.

F. Provide operating instructions and servicing data by a qualified instructor to demonstrate to the Board's authorized personnel in charge of operating, repair, and maintenance of worktops and equipment.

1. Provide not less than 4 copies of operating and maintenance handbooks with addresses and telephone numbers of local service agencies for each item of equipment. Include a list of equipment serial numbers and copies of the manufacturer's warranties on equipment.

1.05 QUALITY ASSURANCE

A. Accessible components shall have a forward approach for accessibility. A parallel wheelchair approach for side access is not acceptable.

1. Rim or counter shall not be higher than 34 inches above finish floor. Provide a clearance of at least 27 inches above the finish floor to the bottom of the apron. See the following for additional clearances and allowable heights.

a. Americans With Disabilities Act and Accessibility Guidelines (ADA).
b. Florida Department of Community Affairs - Florida Accessibility Code for Building Construction (DCA).

B. Conduit and piping shall be concealed when cabinet doors are in an open or closed position. Provide access panels as required for maintenance.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Manufacturer's Supervision: Uncrating, assembly of cabinetwork components shipped loose, installation and hookup of sinks and laboratory equipment shall be supervised by manufacturer or manufacturer's authorized representative according to manufacturer's installation directions and accepted shop drawings.

1.07 SEQUENCING AND SCHEDULING

A. Openings for Cabinetwork: Coordinate temporary openings in walls or windows, if required, for passing large sections of cabinetwork into building not accommodated through permanent openings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Casework and Fume Hoods:

1. CampbellRhea Manufacturing Inc.
2. Collegedale Cabinets, Inc.
3. Fisher Hamilton Manufacturing Co.
4. Kewaunee Scientific Corp.
5. Leonard Peterson and Co., Inc.
6. Sheldon Laboratory Systems.

B. Vandal Resistant Water/Gas Fittings.

1. CampbellRhea Manufacturing Inc.
2. Chicago Faucets.
3. Sheldon Laboratory Systems.
4. Water Saver Co.

2.02 EQUIPMENT

A. Model numbers as specified in text are based on Sheldon Laboratory Systems as a reference only, except as noted. Use of catalog numbers and specific requirements set forth in Contract Documents, are not intended to preclude use of equivalent products by other listed acceptable manufacturers, but are given for purpose of establishing a standard of design and quality for materials, construction, and installation.

B. Casework:

1. Accessible Rinse-Away Sink: Sheldon 27820.

   a. Provide cabinets with doors under both sides of sink.
   b. Center sink with forward accessibility and drainboards on each side of sink.
   c. Provide vandal resistant cold water/gas fitting as specified with no gas cocks.

2. Accessible Safety Center: Sheldon 66100 with forward accessibility and push flag to operate eyewash supply.
3. Acid Storage, with permanent and visible signage indicating storage material (acid or base).

   a. Freestanding: Sheldon 73320 or SE8051.
   b. Acid Storage - Undercounter: Sheldon SE8071.

4. Apron for Computer (36 inches wide): Sheldon APR-36.
5. Apron for Computer and Printer (48 inches wide): Sheldon APR-48.

6. Base Cabinet (24 inches wide with 1 drawer over 1 door): Sheldon 38250.
7. Base Cabinet (36 inches wide with 2 drawers over 2 doors): Sheldon 36210.
8. Base Cabinet (48 inches wide with 2 drawers over 2 doors): Sheldon 36200.
9. Base Cabinet (24 inches wide with 4 drawers): Sheldon 37050.
10. Base Cabinet (36 inches wide with 8 drawers): Sheldon 37010.
11. Base Cabinet (48 inches wide with 8 drawers): Sheldon 37000.
12. Book Shelving Unit (36 inches wide): Sheldon 72330.

    a. Provide backing for book shelving unit.
    b. Provide hardwood shelving. Use of particle board is prohibited.

13. Cabinet (36 inches wide with 2 sliding glass doors): Sheldon 68160.

    a. Provide locking framed glass sliding doors.
    b. Provide 1/4" thick safety glass.

14. Cabinet (36 inches wide with 2 solid swing doors): Sheldon 69212.
15. Flammable Storage Cabinet (43 inches wide): Sheldon 25100.

    a. Comply with NFPA Combustible Liquids Code 30 an LSHA safety requirements.

16. Glass Drying Rack - Wall Mounted: Sheldon 79520.

    a. Laboratory pegboard 20 inches long by 30 inches high by 1 inch thick with 32 pegs (5" long by 3/8" diameter).

17. Instructor Demonstration Center (60 inches wide x 30 inches deep): Sheldon 20620 or 20625 (reversed). Provide the following:

    a. Two rod supports.

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NOTE TO SPECIFIER: Verify the drawings locate the emergency gas, water, and electric shut-offs in the instructor demonstration center.

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b. Separate emergency gas, water, and electric shut-offs conveniently located for teacher access.
c. Vandal Resistant Hot and Cold Water/Gas Fitting: Sheldon 80030.
d. One drench hose with independent water supply, acid waste, and two 120V duplex receptacles.
e. Built-in variable low voltage filtered AC and DC power supply with 5 amp output circuit breaker at physics labs.

18. Instructor Demonstration Desk Extension: Sheldon 20630 or 20635 (reversed).
19. Laboratory Apron Storage Cabinet: Sheldon 68330.
20. Reagent Shelving Unit (36 inches wide): Sheldon 73310.

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NOTE TO SPECIFIER: For the following item, coordinate the proper location of the required electrical duplex receptacle to be 4 inches above the unit.

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21. Safety Glasses Wall Cabinet with Automatic Timer: Sheldon 31170.
22. Sink Base Cabinet (36 inches wide - fixed panel over 2 doors): Sheldon 77270.
23. Sink Base Cabinet (48 inches wide - fixed panel over 2 doors): Sheldon 77260.
24. Tote Tray Storage Cabinet (48 inches wide - 36 trays): Sheldon 69210.
25. Upper Cabinet (with 2 sliding safety glass doors):

    a. 36 inches wide - Sheldon 59340.
    b. 48 inches wide - Sheldon 59350.
    c. Provide 1/4" thick safety glass.

26. Upper Cabinet (with 2 solid swing doors):

    a. 36 inches wide: Sheldon 58210.
    b. 48 inches wide: Sheldon 58200.

27. Utility Table:

    a. 30 inches high - Sheldon 41000 Series.
    b. 36 inches high - Sheldon 51000 Series.

28. Four-Student Lab Table - Sheldon 1748M Pier Table:

    a. Two rod supports.
    b. Two Vandal Resistant Cold Water Fittings: Sheldon 80030.

c. One 120V GFI duplex receptacle.
d. Base cabinet with lockable doors and adjustable shelf.

29. Eight-Student Lab Table - Two Sheldon 1748M Pier Tables:

a. Single epoxy resin top.
b. Four rod supports.
c. Four Vandal Resistant Cold Water Fittings: Sheldon 80030.
d. Two 120V GFI duplex receptacle.
e. Two base cabinets with lockable doors and adjustable shelves.

C. Equipment:

1. Fume Hood - Unifacial (48 inches with supplemental air and operable sash): Sheldon 94404 or Handicap Accessible 94404-ADA.

a. Provide a cupsink and work surfaces of epoxy resin with a molded raised perimeter edge at the countertop, vandal resistant cold water/gas fitting as specified, 120v duplex receptacle, acid waste, blower switch, and light switch.

2. Fume Hood - Bifacial (60 inches with supplemental air and double operable sash): Sheldon 99510 or Handicap Accessible 99510-ADA.

a. Provide a 12-inch diameter sink and work surface of epoxy resin with a molded raised perimeter edge at the countertop, vandal resistant cold water/gas fitting as specified, 120v duplex receptacle, acid waste, blower switch, and light switch.

3. Under Counter Refrigerator (explosion proof): Sheldon 87150.
4. Vandal Resistant Cold Water/Gas Fitting:

a. Vandal resistant combination cold water/2 gas cock fitting with vandal resistant vacuum breaker, vandal resistant aerator, color coding with lettered identification, and epoxy coating.
b. Accepted manufacturers:

1) Sheldon: Unicast 80020.
2) Chicago Faucets: VR-1.

3) CambellRhea: 9527 VRCW.
4) Watersaver Faucets: VR5300-110.

5. Vandal Resistant Hot and Cold Water/Gas Fitting.

a. Vandal resistant combination hot and cold water/2 gas cock fitting with vandal resistant vacuum breaker, vandal resistant serrated tips, color coding with lettered identification, and epoxy coating.
b. Accepted manufacturers:

1) Sheldon: Unicast 80030.
2) Chicago Faucets: 1332-NCL-96152.
3) CambellRhea: 9527 VR.
4) Watersaver Faucets: Two VR5300-110 with one gas cock each, mounted side by side.

D. Components for Preparation Work Counters:

a. Vandal Resistant Hot and Cold Water/Gas Fitting: Sheldon 80030.

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NOTE TO SPECIFIER: For the following item, determine the requirements for drench hose length.

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2. Drench Hose: Rubber hose with spray fittings. Length of hose shall be ____ feet.
3. Under Counter Dishwasher: Residential type.
4. Epoxy resin sinks.
5. Acid waste and two 120V duplex receptacles.

2.03 MATERIALS

A. Woods:

1. Air-dry, then kiln-dry to a moisture content of 6 percent before use.

a. Maintain this moisture content throughout production.

2. Exterior Casework Surfaces Exposed to View: Clear Oak with color and graining conforming with normally accepted standards required of Scientific Laboratory Equipment Industry.

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NOTE TO SPECIFIER: Delete either the paragraph above or below.
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3. Plywood Used for Exterior Surfaces and Interior of Open Cases Exposed to View:

   a. Oak face, 3/4" thick.

      1) Construction using a solid lumber or veneer core will be acceptable.

   b. Full height and wall hung cases shall have 3/4" thick Oak plywood end panels.
   c. Crossbands: 1/16" thick hardwood, exterior faces 1/24" thick plain sliced select grade 1 Oak, and back faces 1/24" thick shall be 5-ply, 1-1/16" thick in cabinets or cases 48 inches and over in height and over 46-3/8" in length.
   d. Doors: 13/16" thick, shall have a solid lumber core and not less than 2 inch wide hardwood edge band glued to the core on all four edges.
   e. Flush Panel Doors 1-1/16" Thick: 5-ply hollow or solid core construction.

      1) 1/16" thick hardwood crossbands shall then be applied over the edge banded core.

   f. Exterior Faces: 1/24" thick plain sliced select Grade 1 Oak and back faces 1/24" thick sound Oak.
   g. Case Backs and Tops for Open Cases: 1/4" thick, 3-ply Oak plywood.

      1) Exterior Faces: 1/24" thick, plain sliced Oak.

B. Interior Plywood Used in Cabinets and Cases, Except Open Cases:

   1. 1/4" Thick Plywood: 3-ply minimum hardwood with Grade A face and Grade B back.
   2. 1/2" Thick Plywood: 5-ply minimum hardwood with Grade A face and Grade B back.
   3. 3/4" Thick Plywood: 7-ply minimum hardwood with Grade A face and Grade B back.
   4. Interior Plywood: Interior grade.

C. Flakeboard or Particleboard: Do not use for any component of casework construction.

D. Tempered Welded Fiber Hardboard:

1. Black, smooth-faced hardboard, having the following physical properties:

    a. Tensile Strength: 4500 psi.
    b. Shear Strength: 3700 psi.
    c. Average Modulus of Rupture: 9600 psi.

E. Glass Used in Fume Hoods or Other Hazardous Locations:

1. Provide 1/4" thick safety glass.
2. The glass shielding fluorescent lights in fume hoods shall be tempered safety glass.

2.04 HARDWARE AND TRIM

A. Drawer and Door Pulls:

1. Extruded aluminum coated with a clear, air-dry lacquer attached to door or drawer with machine screws on 4 inch centers.
2. Plastic pulls are not allowed.

B. Hinges:

1. Five knuckle, 2-1/2" high, stainless steel, institutional heavy duty type with straight wings designed to withstand maximum 150 pound weight, unless otherwise noted.
2. Doors Under 4 Feet High: One pair per door.
3. Doors 4 Feet High and Over: 1-1/2 pairs per door.
4. Mount hinges with flathead screws.

C. Drawer Slides: Knape and Vogt, minimum 100 pound capacity, or accepted equivalent.

D. Locks:

1. Provide as indicated on Drawings or called for on equipment schedule.
2. Locks: Satin chrome or nickel plated steel 5 disk tumbler lock with grooved key.
3. Lock system shall restrict duplicating of keys to registered locksmiths.
4. Exposed Surface of Locks: Match other cabinet trim.
5. Keyed alike per room, unless otherwise directed by A/E.

    a. All cabinet drawer locks keyed to one master key.

E. Magnetic Latches:

1. Provide on swinging doors.
2. Enclose latches in plastic case and operate on a plated steel strike screwed to door.
3. Provide double doors with latches on both doors.
4. Provide full height cases with a latch at the bottom of right-hand door.
5. Use pressure latches where computer diskettes or equipment is to be stored.

F. Steel, Cadmium Plated Elbow Catches and Strike Plates: Provide on left-hand doors of double door cases where locks are specified.

G. Steel, Cadmium, or Chrome Plated Drawer Stops: Provide on inside back of each drawer.

H. Table Leg Shoes: 2-1/2" high of a pliable black vinyl material, unless otherwise directed by A/E.

I. Base Molding:

1. 1/8" thick minimum, 4 inches high, rubber with cove profile. Premolded corners are not allowed. Standard color by casework manufacturer or color as selected by A/E.

J. Upright Rods, Cross Rods, and Ring Support Rods:

1. Anodized aluminum (" or 3/4" diameter, as required).
2. Rod Sockets: Aluminum secured through table tops with locknut and spring washer.
3. Rod Clamps: Heavy duty.

K. Aluminum Label Holders: Self-adhesive type with satin finish designed for 2-1/2" x 1-1/8" cards. Verify card size.

L. Aluminum Number Plates: Self-adhesive type with indented black lettering.

M. Support Struts:

1. Provide two 16 gage channel uprights fastened at top and bottom by two adjustable "U" shaped spreaders, each 1/8" by 1-1/2" by length required to support drain troughs and fume hood superstructures or other abnormal loads.

a. When required, furnish with hangers to support mechanical service piping and drain lines.

2. Finish: Black acid resistant enamel.

N. Shelf Standards and Shelf Support Clips:

1. Mount on interior of cabinets and cases to provide shelf adjustment on 1/2" or 32mm centers.
2. Shelves Longer Than 4 Feet: Support at center by an additional standard and a bracket.

O. Tote Trays: Molded one-piece plastic in sizes specified.

P. Trim Parts: Provide as required for a complete installation including scribes, filler panels, base molding, corner clips, and the like.

2.05 FINISH

A. Surfaces to be Finished:

1. Exposed exterior and exposed interior surfaces of cabinets shall receive the full finishing process.
2. Unexposed interior surfaces of cupboards, drawers, wall cases, upper cases, and tall cases shall receive a baked on protective coat of moisture and chemical resistant sealer and a top coat of clear varnish.
3. Other unexposed surfaces shall receive standard finishing steps and a baked on protective coat of moisture and chemical resistant sealer.

B. Finishing Process:

1. Before assembly, machine sand plywood and lumber for doors, drawers, and cabinets to remove loose fibers, scratch marks, and abrasions. After assembly, fine-finish drawers, doors, and casework to provide a consistently smooth surface.
2. Before first finishing process, remove loose fibers and dust.
3. Stain selected surfaces to the desired color and allow to dry.
4. Apply protective coat of moisture and chemical resistant sealer.
5. After flash drying, oven bake items at 130 degrees F.
6. Following a cool down period, hand sand and wipe clean surfaces receiving final top coat.

7. Apply top coat of clear varnish, allow to dry, and oven bake at 130 degrees F.

2.06 METAL CASEWORK

A. After the units have been completely welded together and before finishing, give metal casework and parts a prepaint treatment to provide adhesion of the finish system to the metal and to aid in the prevention of corrosion.

1. Accomplish physical and chemical cleaning of metal by washing with a hot alkaline cleaner, followed by a spray treatment of a metallic phosphate solution.
2. Rinse units with deionized water immediately following the phosphate treatment, dry, and then immerse entire cabinet in an electro-coating bath of corrosion protection of a base color standard to the manufacturer.

   a. Cure electro-deposited coating by baking at elevated temperatures.

3. Casework specified to be a color other than the standard base color shall then receive an additional sprayed-on color coat, of a manufacture's standard color selected by A/E, on all surfaces exposed to view after installation.

2.07 CONSTRUCTION

A. Cabinets:

1. Construct with solid ends and backs, flush overlap doors and drawers, astragal strip between double swinging doors, and a fully enclosed toe space.
2. Cabinet Ends Panels: 3/4" thick Oak plywood (exposed), 3/4" thick hardwood plywood (unexposed), with panels faced with 3/8" x 3/4" solid Oak.
3. Glue end panels to top and bottom horizontal frames, and any intermediate frames through blind mortise and tenon joints, and further secure with countersunk screws.
4. Base cabinet backs: 1/4" thick hardboard, rabbeted into the end panels, and where access to plumbing is required, make backs removable without use of tools.

   a. Fiberboard as backs for wall supported cabinets is not allowed.

5. Cupboard Bottoms: 3/4" thick hardwood plywood with Oak veneer.
6. Base Cabinet Shelves: Half-width removable or full width adjustable, and make bed made of 3/4" thick hardwood plywood with solid Oak facing.
7. Provide 2-1/2" deep x 4 inch high cabinet toe space fully enclosed and integral with the cabinet.
8. Frames sizes as follows:

    a. Top Horizontal:

        1) Front Member: 1-3/4" x 3/4" Oak.
        2) Side and Rear: 2" x 3/4" Oak.
        3) Center Mullion: 2-1/2" x 3/4" Oak.

    b. Intermediate Horizontal:

        1) Front Member: 1-3/4" x 3/4" Oak.
        2) Side and Rear: 2" x 3/4" hardwood.
        3) Center Mullion: 2-1/2" x 3/4" hardwood.

    c. Bottom Panel: 3/4" thick hardwood plywood with Oak Veneer.

B. Drawers: Drawer construction shall withstand 100 pound load.

1. Fronts: 13/16" thick solid Oak overlapping opening on all four sides for dust protection.
2. Sides: 1/2" thick, solid hardwood or laminated select hardwood veneers, assembled to front with appropriate joinery and nosed to prevent splintering.
3. Mortise and tenon drawer sides and drawer fronts and glue drawers together under 3 inches in depth.
4. Let drawer bottoms into 1/8" deep grooves at drawer sides and front.

C. Intermediate Knee Space Aprons:

1. 13/16" thick solid Oak at front and side members with 13/16" thick hardwood at rear, radius the bottom edge 1/4".
2. Independently support aprons on brackets, bolt to structure for L and C frame and suspend with appropriate hangers on J frame support system.

    a. Where drawers are indicated, drawer construction shall be the same as specified.

2.08 MECHANICAL SERVICE FITTINGS

A. Laboratory Service Fittings: Laboratory grade with valve bodies of cast bronze with a minimum copper content of 85 percent, chrome plate the fittings, unless otherwise specified. Install under Division 15.

B. Water Faucets: Furnished and installed by manufacturer. Plumbing connections and testing shall be provided as required under Division 15. Use vandal resistant vacuum breaker fittings on all water or water-related items.

C. Provide an independent water supply line for the accessible safety center.

D. Provide acid-proof drains at all sink locations.

E. Ground Key Valve Hose Cocks for Gas:

1. Forged brass bodies and forged brass tapered plugs with broad fit handles with a minimum length of 2 inches beyond index for convenient use.

   a. Valve Bodies: Individually lapped, ground, and sealed.
   b. Retaining Spring: Beryllium copper, dirt resistant cup type.

      1) Worm type springs are not allowed.

2. Furnish handles with color coded service indexes.

   a. Hold indexes for hose cocks in place by a threaded retainer ring that threads onto hose cock over flange of index.

F. Serrated Hose Connectors: Provide on service fittings, either removable or integral, unless otherwise specified.

G. Remote Control Valves:

1. Water: Removable and replaceable units containing all parts subject to wear.
2. Gases: Floating steel cone and replaceable stainless steel seat.
3. Provide remote control valves complete with hexagonal brass extension rods, four arm black plastic handles and escutcheon plates.
4. Provide handles with tamperproof and vandal resistant

color coded service indexes.

H. Tank Nipples:

1. Provide with locking nut and washer for fixtures where fittings are anchored to equipment.
2. Provide tailpieces and/or adaptors under Mechanical Division 15.

I. Furnish waste lines under Division 15.

J. Furnish traps other than those specified in this section under Division 15.

K. Neutralization Provisions: (New) (Existing) centralized system.

L. Sink Outlets: Molded epoxy resin, with integral cross bars, tapered for overflow, complete with gasket and locknut with 1-1/2" IPS male straight thread outlet.

M. Vandal Resistant Vacuum Breakers: Epoxy coated, at all laboratory equipment.

N. Electrical Fittings:

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NOTE TO SPECIFIER: Do not downgrade the requirements to the paragraph below. Electrical Engineer may upgrade the requirements as necessary.

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1. 20 amps, 125 volt AC, 3-wire polarized grounded receptacles, unless otherwise specified.

   a. Pedestal and Line-type Boxes: Aluminum metallic finish with stainless steel flush plates.
   b. Receptacle Boxes: Plated steel.

2.09 EPOXY RESIN TOPS

A. Base Countertops and Instructor Demo Desks:

1. 1 inch thick tops.
2. 4 inch high backsplashes or curbs as shown.
3. Non-glaring, of uniform mixture throughout.
4. Color: Black.
5. Provide drip groove.

B. Table Tops and Fume Hood Work Surfaces:

1. One inch thick.
2. Round exposed edges, except as indicated below, to a 1/4" radius at front top edge and at vertical corners.
3. Curbs on special width tops and around special cutouts shall be same thickness as tops, bonded to surface of top to form a square joint.
4. Sink Cutouts:

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

5. Indent table tops 1/4" to provide a raised rim 5/8" wide around all exposed edges.
6. Round inside top edge of raised rim and exposed vertical corners to a 1/8" radius.
7. Cove juncture between raised rim and top surface to a 1/8" radius.
8. Physical Properties:

    a. Flexural Strength: ASTM D790-91, 12,000 lbs./sq. in.
    b. Compressive Strength: ASTM D695-91, 35,000 lbs./ sq. in.
    c. Hardness, Rockwell M: ASTM D785-89, 100.
    d. Water Absorption: ASTM D570-81(1988):

        1) Percent by weight, 24 hours 0.02
        2) Percent by weight, 48 hours 0.03

2.010 SINK AND CUP DRAINS

A. Epoxy Resin Sinks and Cup Drains:

1. Non-glaring, black in color with inside corners coved and the bottom pitched to drain outlet.
2. Mold in one piece, have an internal mounting flange, be complete with strainer neoprene washer, and have 1-1/2" IPS male straight thread outlet. Sink bottoms shall slope down to drains.
3. Meet following mechanical and physical strength requirements.

    a. Tensile Strength: ASTM D638-91, 9,500 lbs./ sq. in.
    b. Compressive Strength: ASTM D695-91, 38,000 lbs./sq. in.

c. Flexural Strength: ASTM D790-91, 19,500 lbs./sq. in.
d. Hardness, Rockwell M: ASTM D785-89, 115.
e. Density: ASTM D792-91, 1.93 gram/cc.
f. Water Absorption: ASTM D570-81(1988).

1) Percent by weight, 25 hours, 0.02.
2) Percent by weight, 48 hours, 0.03.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not install finish millwork and cabinetwork until plaster work is completely dry and humidity conditions are within operating ranges for the building.

3.02 INSTALLATION

A. Install cabinetwork plumb, true, and square with horizontal lines level, joints tight, and units rigidly secured in place and together.

B. Install units by qualified personnel experienced in setting factory built cabinets and laboratory equipment.

C. Set cabinets in line and plumb and level by means of wood shims or by levelers provided in each cabinet unit.

1. Screw base to floor at 24 inches o.c.
2. Screw cabinet to base at 24 inches o.c. and if against wall, also screw to wall at 16 inches o.c. at top hangrail.

D. Carefully scribe, fit, and install fillers to produce a neat closure between building walls and cabinet units.

E. Field cut and scribe cabinet tops and splashes as required to fit job conditions.

F. Place tops on base cabinets, carefully fitting miters and field joints.

G. Seal epoxy resin sinks to countertops with epoxy resin cement.

H. Seal joints in epoxy resin type laboratory tops, splashes and chemical resistant shelving watertight on assembly with

epoxy chemical resistant cement supplied with laboratory furniture.

I. Pull joints tight with concealed KV "Tite-Joint" fasteners.

J. Secure tops to base cabinets with galvanized screws from inside cabinets.

K. Install base and wall cabinets with suitable anchors into metal stud furring spaces or masonry walls approximately 16" o.c., not less than four required each unit.

1. Install two anchors in top mounting rail and two in bottom rail.
2. Carefully align units, level and firmly anchored to substrates.

L. Mechanical Stub-Outs:

1. Temporarily terminate cold water, hot water, and gas lines at the shut-off valves near respective items at stub-out locations indicated on accepted cabinet manufacturer's installation drawings.
2. Temporarily terminate drain lines at sanitary stub-out locations indicated on the accepted manufacturer's installation drawings, make final service connections.

M. Electrical Stub-Outs:

1. Temporarily terminate electrical work at stub-out locations indicated on accepted manufacturer's installation drawings, make final service connections.

3.03 TESTING AND ADJUSTMENTS

A. Field test each unit after completion of installation to verify proper operation of hoods according to specified requirements.

B. Perform tests according to Section 7 of Scientific Apparatus Makers Association Standard LF-10.

3.04 CLEANING

A. After assembly, installation and hookups are complete, remove protective material from finished surfaces, clean exposed exterior and interior surfaces, and leave in satisfactory condition.

1. Do not use abrasive commercial cleaners on plastic and chrome plated surfaces.
2. Apply a minimum of one coat silicone wax to wood surfaces per equipment manufacturer's directions.

END OF SECTION