

DIVISION 12 - SECTION 12320 - MANUFACTURED WOOD CASEWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions and Supplementary General Conditions and other Specification Sections, apply to this section.

1.02 DESCRIPTION OF THE WORK

- A. Work in this section is part of a combined project involving renovation to an existing building coupled with construction of a new addition and requires closely coordinated work sequences. The existing building will be occupied during the construction period and the contractor will be required to perform his work accordingly.
- B. Work in this section includes, but is not necessarily limited to,
1. Built in perimeter casework consisting of manufacturer's stock components for base cabinets and upper cabinets with epoxy resin work surfaces
 2. Instructors Demonstration Bench
 2. Table Frames; Student Lab Benches
 3. Tall Cabinets and Storage Units
 4. Sinks, Drain Outlets, Fittings
 5. Fume Hoods
 6. Emergency Equipment.

1.03 RELATED SECTIONS

Division 6 - Section 06100 - Rough Carpentry

Division 6 - Section 06200 - Finish Carpentry

Division 8 - Section 08710 - Finish Hardware

Division 9 - Section 09900 - Painting

Division 15 - Section 15411 - Water Distribution Piping

Division 15 - Section 15420 - Drainage And Vent Systems

Division 15 - Section 15488 - Natural Gas System

Division 15 - Section 15493 - Laboratory Drainage Systems

Division 15 - Section 15760 - Fans

Division 15 - Section 15820 - Ductwork And Accessories

Division 16 - Section 16140 - Wiring Devices And Installation Components

1.04 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 the manufacturing of wood laboratory casework and fume hoods.
 2. Ten installations of equal or larger size.
 3. Must be a member of AWI and be QCP certified.
- C. Installers Qualifications: Contractor shall meet provisions outlined in the General Conditions related to the installation of manufactured wood casework and demonstrate successful experience in installing items similar in type and quantity to those required for this project.

1.05 SUBMITTALS

- A. Product Data: Provide and submit, as outlined in the General Conditions, product data for each type of product and process specified in this section and incorporated into items of architectural casework during fabrication, finishing and installation.
- 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 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.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Protect casework during transit, delivery, storage and handling to prevent damage, soilage and deterioration.
- B. Do not deliver casework until painting, wet work, grinding and similar operations that could damage, soil or deteriorate casework have been completed in installed areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions".

1.07 JOB CONDITIONS

- A. Environmental Conditions: Comply with casework manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for casework during its storage and installation. Do not install casework until these conditions have been attained and stabilized so that casework is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
- B. Field Measurements: Where casework is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements and indicate on shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with general condition requirements, the following manufacturer's products were used in determining design standards and criteria. Specific model numbers and product descriptions are for reference purposes only and are not to be construed as proprietary. Other manufacturers which can demonstrate to the satisfaction of the Architect that their products are "or equal" or superior to those noted below will be considered. "Or equal" includes any color, texture, finish, material composition or any other specific design or quality control criteria noted in the specifications or on the drawings. Manufacturer's whose products can not meet the requirements stated below may not be considered as "or equal".

Casework is based upon the "Regency" line of standard cabinetry components as manufactured by Thermo Fisher Scientific, 1316 18th Street, Two Rivers, Wisconsin

- B. Nationally recognized manufacturers proposing casework different from that specified must submit sufficient documentation (drawings, specifications, construction details and samples) to indicate **compliance** with the requirements of these specifications, and secure written approval by the Architect prior to submission of actual project submissions outlined in Section 01340 - Submittals.

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, including tops and bottoms of shelves.
- c. Interior surfaces of open units, including tops and bottoms of shelves.
- 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.
- h. All front edges of shelving.

2. SEMI-EXPOSED SURFACES

- a. Surfaces visible when doors or drawers are open.
- b. Bottoms of cabinets 30" – 42" above finished floor.

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, free of defects. All lumber kiln dried to uniform moisture content of 6%-8%.
 - a. Exposed material: Red Oak - Plain sliced, A Grade
 - b. Semi-exposed material - Select hardwood.
 - c. Concealed material - Sound hardwood of species suitable for the intended purpose.

C. Plywood:

1. Core: 7-ply minimum (3/4" thick), 9-ply minimum (1" thick) and 13-ply minimum (1-1/2" thick) veneer core plywood with cross and face plies bonded with Type II water resistant glue.
2. Face veneers:
 - a. Exposed surfaces: Rift cut red oak veneer, grade A, selected Book matched,
 - b. Semi-exposed: Same species as exposed, grade B
 - c. Concealed: Same species as semi-exposed.

D. Hardboard: Wood fibers and natural resin binders formed under heat and pressure.

E. Glass: Tempered safety glass (3mm on wall/upper cases and 6mm on tall cases).

F. NAUF Glue: Laminating; Type II water resistant; assembly; Type III water resistant.

- G. Edgebanding: 3mm hardwood on all edges of doors and drawers; fronts of shelves, base, wall, upper and tall cases. Bottoms and tops of wall, upper and tall case end panels to be .5mm.
- H. Finish: Exposed and semi-exposed surfaces to have a highly chemical resistant, HAP's (Hazardous Air Pollutants) free water based finish with built in U.V. blocker and stain. A minimum of 10 stain color choices shall be available. Finish must have less than 2.0 lbs per gallon of VOC's per EPA Method 24. Products with Aziridin and Iso-cyanate will not be allowed.

2.03 CASEWORK FABRICATION

A. Base Units:

1. Cabinet ends: 3/4" thick plywood (for both exposed and concealed ends) with 3mm hardwood banding on front edges. Bore interior faces, as appropriate, for security panels, rails, and four rows of shelf support holes:
2. Top rails Front and Back:
 - a. Horizontal front top rail: 1" x 3" exposed solid hardwood or edge banded 9-ply minimum veneer core plywood. Attach to cabinet ends with glued 8mm dowel joinery and screws.
 - b. Vertical back top rail: 3/4" x 3-3/4" solid hardwood or 7-ply minimum veneer core plywood. Attach to cabinet ends with glued 8mm dowel joinery and screws.
3. Intermediate rails: Front horizontal intermediate rail: 3/4" x 1-1/2" exposed solid hardwood rail to be provided between doors and drawers. Secure to cabinet end panels with glued 8mm dowel joinery.
4. Toe space rail: 3-3/4" x 3/4" hardwood or 7-ply minimum 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 and metal fasteners. Front edge to be banded with 3mm hardwood banding. Suspended unit bottoms to be 1" thick. **Removable bottoms are not acceptable.**
6. Backs: Cupboard units: One-piece 3/16" thick hardboard, rabbetted into rear top rail for easy removal from inside of cabinet.
7. Shelves: 1" thick, 9-ply minimum veneer core plywood; 3mm hardwood banded on front edge, adjustable on 32mm centers.
 - a. Depth: Full depth shelf, 17-3/4" deep.
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 multiple dovetail all four corners.
 - 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. **Staples are not acceptable.** Material to be: White coated MDF board.
9. Door and removable drawer front construction:
 - a. 3-ply, 3/4" thick (door) and 1/2" thick (drawer) particleboard core with 3/4" x 3/4" hardwood framed all four sides and 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 7-ply minimum veneer core plywood or lumber as required, with same stain and finish.

11. SCHEDULE OF BASE CABINETS (Model numbers are Fisher Hamilton as standard of design intent and quality)

2 Door - Sink Base	36"	025C672
Sink Base ADA Compliant	36"	950C022
2 Door - 2 Drawer	36"	148C362
1 Door - 1 Drawer	24"	136C432 - RHS 137C432 - LHS
1 Door - 5 Drawer (Left)	36"	208C632
1 Door - 5 Drawer (Right)	36"	207C632

B. Upper Wall 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 minimum veneer core plywood with 3mm hardwood banding on front edge.
3. Bottoms: 1" thick, 9-ply minimum veneer core plywood with 3mm hardwood banding on front edge.
4. Semi-exposed backs: 1/4" thick veneered MDF plywood with backs recessed 7/8" and set into top, bottom and ends, sealed with hot melt glue process around entire perimeter.
5. Shelves, 1" thick, 9-ply minimum veneer core plywood; 3mm hardwood banded on front edge, adjustable on 32mm centers.
 - a. Depth: Full depth shelf, 17-3/4" deep.
6. Door construction: 3-ply, 3/4" thick particleboard core with 3/4" x 3/4" hardwood framed all four sides and 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. For sliding doors: nylon roller suspension riding in overhead steel track with bottom retainer strip.
8. Fillers, scribes, etc.: Shall be of same species and grade as adjacent exposed surfaces, either 3/4" thick 7-ply minimum veneer core plywood or lumber as required, with same stain and finish.

9. SCHEDULE OF WALL CABINETS (Model numbers are Fisher Hamilton as standard of design intent and quality)

2 Door (Solid Door)	36" X 12"	706C651
2 Door (Solid Door)	30" X 12"	706C551
1 Door (Solid Door)	24" X 12"	702C451 - RHS 703C451 - LHS

C. 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 minimum veneer core plywood with 3mm hardwood banding on front edge.
3. Exposed backs: 1/4" thick veneered MDF plywood with backs recessed 7/8" and set into top, bottom and ends, sealed with hot melt glue process around entire perimeter.
Melamine printed veneers and backs that extend through the bottom panels are not acceptable.

4. Shelves:
 - a. Fixed Shelf: There shall be at least one fixed shelf in each tall case to ensure stability of the unit. The fixed shelf shall be 1" thick, 9-ply minimum veneer core grain to run left to right.
 - b. Adjustable Shelves: 1" thick, 9-ply minimum veneer core plywood; 3mm hardwood banded on front edge, adjustable on 32mm centers.
 - c. Depth: Full depth shelf, 17-3/4" deep.
5. Door construction: Flush overlay doors shall be 3-ply, 3/4" thick particleboard core with 3mm hardwood banding on all four edges.
6. 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. For sliding doors: nylon roller suspension riding in overhead steel track with bottom retainer strip.
7. SCHEDULE OF TALL CABINETS (Model numbers are Fisher Hamilton as standard of design intent and quality)

2 Door - Wardrobe (Solid Door)	36" X 22"	950C522
2 Door - Storage (Solid Door)	36" X 22"	806C692
2 Door - Storage (Glass Door)	36" X 22"	812C692
2 Door - Storage (Glass Sliders)	42" X 22"	815C792
8. Room Assignment of Tall Cases: Per enlarged plan Drawing A-5.4 the following tall cases are to installed:

Science Lab	402	3 Sliding Glass Door 1 Solid Door 1 Glass Door	Prep Room	402A	1 Wardrobe 2 Solid Door
Science Lab	418	3 Sliding Glass Door 1 Solid Door 1 Glass Door	Prep Room	418A	1 Wardrobe 2 Solid Door
Science Lab	422	4 Sliding Glass Door 1 Solid Door 1 Glass Door	Prep Room	422A	1 Wardrobe 2 Solid Door
Science Lab	424	3 Sliding Glass Door 1 Wardrobe 1 Solid Door			

D. Hardware:

1. Drawer suspension: 3/4 extension, open roller, 100 lb. dynamic load, self-closing epoxy coated.
2. Drawer and hinged door pull:
 - a. 4" Wire: [Specifier's Option]
 - b. Satin chrome (Plated).
3. All pulls are mounted horizontally on drawers and vertically on doors
4. Hinges: Concealed, steel, 165 degree, self closing, 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. Unit shelf supports: Metal pin and socket.
6. Door catches: Magnetic.
 - a. Tall cabinet door catches on two door units when locks are required: Heavy-duty

spring bolts located at top and bottom of door without the lock. Bolts are attached to one another by means that will conform to ADA requirements.

7. Elbow catches: Spring type with strike.
8. Locks: 5-disc tumbler for MASTER key system locks shall be installed on all drawers and doors.

2.04 EPOXY RESIN WORK SURFACE

- A. Material: Chemical and abrasion resistant, durable top of one inch thick cast material of epoxy resins and inert products, cast flat, with a uniform non-glare black matte finish.
- B. Backsplash curb: Same material as top, 4" high, integral with top, with 5/8" covered juncture to top surface]]. Provide where indicated on drawings or where tops abut wall surfaces and at reagent ledges. Include end curb where top abuts end wall.

2.05 INSTRUCTOR DEMONSTRATION DESK

- A. Configuration: Instructor Demonstration desk shall consist of one 36" wide extended depth of 31" 6 drawer base cabinet unit model number 212C622 and one 36" wide extended depth of 31" two door sink base unit model number 115C622 separated by a 24" open space. On the instructor side this open space shall contain a knee space drawer frame model number 501C1150. The open space on the student side shall be in filled on one side with a 24" wide 15" deep open cabinet model number 944C306.
- B. Countertop: 1" Epoxy resin countertop with integrated sink as specified below in section 2.08 - A - 1a.
- C. Support Rod Assembly: provide rod support assembly consisting of two vertical rods with horizontal connecting rod. Assembly shall attach to the countertop through grommets

2.06 4 STUDENT TABLE ASSEMBLIES

- A. Unit: 72" by 48" by 36" in height student lab table model number 944C4555.
- B. Countertop: 1" Epoxy resin countertop with integrated sink as specified below in section 2.08 - A - 1b.
- C. Support Rod Assembly: provide rod support assembly consisting of two vertical rods with horizontal connecting rod. Assembly shall attach to the countertop through grommets
- 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 shoes: Black rubber or vinyl with provision for floor clip.

2.07 WOOD FINISH

- A. Chemical Resistance Test Procedure: Follow SEFA 8 standards for chemical resistant testing and evaluations. In addition, finished panels shall also be tested vertically during exposure to the test chemicals. Chemical concentrations shall be adjusted by the weight 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 and blotted dry. After 24 hours, the test surface shall be scrubbed with a damp paper towel and dried with paper towels, then evaluated.
 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.
3. Ratings:
 - a. No effect - Indicates no effect in gloss or color.
 - b. Excellent - Indicates slight change in gloss or color.
 - c. Good - Indicates slight surface etching or discoloration.
4. Test results: (Minimum requirements in addition to no more than four, level 3 per SEFA standards)

REAGENT	HORIZONTAL TEST <u>RATING</u>	VERTICAL TEST <u>RATING</u>
1. Amyl Acetate	No effect	No effect
2. Ethyl Acetate	No effect	No effect
3. Acetone	No effect	No effect
4. Acid Dichromate 5%	No effect	No effect
5. Butyl Alcohol	No effect	No effect
6. Ethyl Alcohol	Excellent	No effect
7. Methyl Alcohol	No effect	No effect
8. Ammonium Hydroxide 28%	Excellent	No effect
9. Benzene	No effect	No effect
10. Carbon Tetrachloride	No effect	No effect
11. Chromic Acid 60%	Excellent	No effect
12. Chloroform	No effect	No effect
13. Dimethyl Formamide	No effect	No effect
14. Dioxane	No effect	No effect
15. Ethyl Ether	No effect	No effect
16. Formaldehyde 37%	No effect	No effect
17. Gasoline	No effect	No effect
18. Hydrochloric Acid 37%	Excellent	No effect
19. Hydrofluoric Acid 48%	No effect	No effect
20. Hydrogen Peroxide 30%	No effect	No effect
21. Methyl Ethyl Ketone	No effect	No effect
22. Mono Chlorobenzene	No effect	No effect
23. Naphtha, VM&P	No effect	No effect
24. Nitric Acid 30%	No effect	No effect
25. Nitric Acid 70%	Good-stain	Good-stain
26. Phosphoric Acid 85%	No effect	No effect
27. Silver Nitrate, Saturated	No effect	No effect
28. Sodium Hydroxide 10%	No effect	No effect
29. Sodium Hydroxide 20%	No effect	No effect
30. Sodium Hydroxide 40%	No effect	No effect
31. Sodium Hydroxide, Flake	No effect	No effect
32. Sodium Sulfide, Saturated	No effect	No effect
33. Sulfuric Acid 77%	No effect	No effect
34. Toulene	No effect	No effect
35. Trichlorethylene	No effect	No effect
36. Xylene	No effect	No effect
37. Zinc Chloride, Saturated	No effect	No effect
38. Acetic Acid	Excellent	Excellent
39. Sulfuric Acid 77% and Nitric Acid 70%, equal parts	Good-stain	Good-stain

2.08 ACCESSORIES

- A. Epoxy Resin Sinks: Integrally molded from modified thermosetting black epoxy resin, specially compounded and oven cured. Cove inside corners and pitch bottom to threaded drain outlet. Product numbers refer to equipment manufactured by Fisher Hamilton and is noted as the basis of design and quality only as stated in paragraph
1. Size & Fixtures: as noted below:
 - a. Teacher Demonstration Desk:
 - 1) Sink: 18" x 15" x 5" deep w/ Soltra Outlet, Stopper and Strainer
 - 2) Double service fixture for hot and cold water and gas - # 32L3530G
 - b. Student Lab Tables:
 - 1) Sink: 18" x 12" x 6.8" deep w/ Soltra Outlet, Stopper and Strainer
 - 2) Double service fixture for hot and cold water and gas - # 32L3530G
 - c. Perimeter Lab Benches:
 - 1) Sink: 18" x 12" x 6.8" deep w/ Soltra Outlet, Stopper and Strainer
 - 2) Mixing Faucet w/Wrist Blade handles - # 32L45200
 - d. Perimeter Lab Bench - Prep Room:
 - 1) Sink: 18" x 15" x 5" deep w/ Soltra Outlet, Stopper and Strainer
 - 2) Mixing Faucet w/Wrist Blade handles - # 32L45200
 2. Sink supports:
 - a. Cabinet sinks: Support sinks on 11 gauge, adjustable, 1" x 2" x 1" channel with reagent resistant finish. Provide two channels across width of cabinet, attached to 3/8" diameter threaded hanger rods.
 - b. Table sinks: Support sinks on 2" wide, U-shaped steel straps screwed to cross rails. Straps shall be 1/4" thick; 1/2" thick for sinks over 250 sq. in. in area. Straps shall have baked enamel finish.
 - c. Caulk joint between top and sink with non-hardening mastic.

2.09 FUME HOODS

A General

1. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.
2. Average illumination of work area: Minimum 80 footcandles. Work area shall be defined as the area inside the superstructure from side to side and from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.
3. Fume hood shall maintain essentially constant exhaust volume at any baffle position for safety. Maximum variation in exhaust CFM, static pressure and average face velocity as a result of baffle adjustment shall not exceed 5% for any baffle position at the specified face velocity.
4. Fume hoods shall be field convertible, from bypass type to auxiliary air by simple component replacement or addition. Change-over shall be accomplished without construction modifications and without special tools.
5. Noise Criteria: Test data of octave band analysis verifying hood is capable of a 50 NC value when connected to a 50 NC HVAC source. Reading taken 3' in front of open sash at 100 fpm face velocity.

B. Design Criteria: For the purpose of design quality SafeAire Restricted Bypass Fume Hood model number 54L2597 for 72" wide unit as manufactured by Fisher Hamilton L.L.C., 1316-18th Street, Two Rivers, Wisconsin 54241.

C. Materials

1. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM A366; gauges U.S. Standard and galvanized.
2. Stainless steel: Type 304; gauges U.S. Standard.
3. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.
4. Bypass grilles: Low resistant type, 18 gauge steel, upward directional louvers.
5. Safety glass: 7/32" thick laminated safety glass.
6. Sash cables: Stainless steel, uncoated, 1/8" diameter military spec. quality. (MIL-W-83420D-3)
7. Sash guides: Corrosion resistant poly-vinyl chloride.
8. Pulley assembly for sash cable: 2" diameter, zinc dichromate finish, ball bearing type, with cable retaining device. (Nylon tired-not acceptable.)
9. Sash pull: Full width corrosion resistant plastic, stainless steel or steel with chemical resistant powder coating.

D. Fume Hood Construction

1. Superstructure: Rigid, self supporting assembly of double wall construction, maximum 4-7/8" thick.
 - a. Wall consists of a sheet steel outer shell and a corrosion resistant inner liner, and houses and conceals steel framing members, attaching brackets and remote operating service fixture mechanisms and services. Panels must be attached to a full frame construction, minimum 14 gauge galvanized members. Panels and brackets attached to eliminate screw heads and metallic bracketry from hood interior.
 - b. Access to fixture valves concealed in wall provided by exterior removable access panels, gasketed access panels on the inside liner walls, or through removable front posts.
2. Exhaust outlet: Rectangular in sizes as shown on the drawings with ends radiused, shaped and flanged, 18 gauge stainless steel exhaust collars welded in place
3. Blower: 1/2 hp 1024 rpm 120 v single phase 60 hz; 1240 cfm @ 3/4" clockwise rotation with up blast discharge.
4. Fume hood sash: Full view type with clear, unobstructed, side-to-side view of fume hood interior and service fixture connections.
 - a. Bottom sash rail: 2" maximum, 18 gauge steel with urethane powder coat finish. Provide integral formed, flush pull the full width of bottom rail.
 - b. Set safety glass into rails in deep form, extruded poly-vinyl chloride glazing channels.
 - c. Counter balance system: Single weight, pulley, cable, counter balance system which prevents sash tilting and permits one finger operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full length of travel. Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure. Life cycle test 100 pound sash and weight to 100,000 cycles without sign of failure. Provide independent test data.
 - d. Open and close sash against rubber bumper stops.
5. Fume hood liner: Resisto-Roc panel coated with chemically resistant enamel finish, off-white in color Finish shall be chemical fume and splash resistant.

6. Baffles: Baffles providing controlled air vectors into and through the fume hood must be fabricated of the same material as the liner. Provide exhaust slots full height on vertical sides of the baffle with upper slots adjustable. All baffle supports/brackets to be non-metallic.
7. Remote baffle adjustment: Toggle style, one handed, single point control, accomplished while hood is in use, without disturbing apparatus, from outside right hand corner post of fume hood with sash in either the open or closed position, and permitting setting for (1) high thermal loading and (2) normal or average operation.
8. Service fixtures and fittings:
 - a. Two tube fluorescent light fixture, light switch and two duplex 120 v receptacles
 - b. Integrated sink within counter with CW gooseneck faucet
 - c. Gas connection
9. Hood light fixture: Two lamp/T8, rapid start, UL listed fluorescent light fixture with sound rated ballast installed on exterior of roof. Provide safety glass panel cemented and sealed to the hood roof.
10. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Provide 250 V.A.C. receptacles where specified. Flush plates: Black acid resistant thermoplastic.
11. Work surfaces: 1" thick molded resin work surface, dished a nominal one-half inch to contain spills.

E. Restricted Bypass Fume Hoods

1. Bypass shall be sufficient in size to allow 25% flow with sash closed. Bypass must be achieved through grill or louver on face of front lintel panel.
2. Sash: Standard vertical-rising
3. Bypass: Positive in action and controlled by the sash operation.
4. Low impedance, directionally louvered panel provided in the lintel bypass area and one inch bypass provided immediately above the work surface and directly below the bottom horizontal sash rail. Designs which require all bypass to enter hood over front solid panel - not acceptable.
5. Width: - 72" or as shown on the contract drawings
6. Reinforce work surface to handle heavy loads (200 pounds per sq. ft.) from lead shielding.

F. Metal Finish

1. Exterior: Steel with an epoxy coating
2. Interior: Resisto-Roc panel coated with chemically resistant enamel finish, off-white in color Finish shall be chemical fume and splash resistant.

2.10 SAFETY EQUIPMENT

A. Combination Safety Cabinet

1. Open cupboard model number 950C1750 as manufactured by Fisher Hamilton constructed of the same material, finish as height as the tall cases includes ADA compliant counter height 1" thick resin work surface and two fixed shelves above
2. Eye Wash: Stainless steel eye wash fountain with plunger panel set into counter
3. Emergency Shower: Overhead shower head with emergency pull chain that when pulled releases a steady stream of water

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. Blocking in wall by rough carpentry, Division 6.
4. Align top edge surfaces in one true plane. Provide flush joints not to exceed 1/8" between top units.
5. Secure upper portion of Tall Cases to solid supporting material such that by pulling on the door the case will not tip forward and fall. When securing two or more tall cases in a row align the tops of the tall cases in one continuous line - shim cases at floor to achieve alignment.

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.

3.02 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.

3.03 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 12320