**PART 1 – GENERAL**

**1.01 SUMMARY**

 A. Section Includes:

 1. Steel casework.

 2. Table frames.

 3. Work surfaces.

 4. Sinks and outlets.

 5. Service fittings.

 6. Accessory equipment.

 B. Related Sections:

 1. Section 11610 ‑ Laboratory Fume Hoods are a part of the work of this section.

 2. Section ‑ : Furnishing and installation of plumbing utilities and final connections.

 3. Section ‑ : Furnishing and installation of exhaust ductwork and equipment, and final connection to fume hood(s).

 4. Section ‑ : Furnishing and installation of electrical utilities and final connections.

**1.02 CASEWORK DESIGN REQUIREMENTS**

 A. Flush construction: Surfaces of doors, drawers and panel faces shall align with cabinet fronts without overlap of case ends, top or bottom rails. Horizontal and vertical case shell members (panels, top rails and bottoms) shall meet in the same plane without overlap.

 B. Slim line styling: Front width of end panels 3/4" and front height of top and bottom members 1".

 C. Self-supporting units: Completely welded shell assembly without applied panels at ends, backs or bottoms, so that cases can be used interchangeably or as a single, stand‑alone unit.

1. Interior of case units: Easily cleanable, flush interior. Base cabinets, 30" and wider, with double swinging doors shall provide full access to complete interior without center vertical post.

 F. Drawers: Sized on a modular basis for interchange to meet varying storage needs, and designed to be easily removable in field without the use of special tools.

 G. Case openings: Rabbeted‑like joints all four sides of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.

 H. Framed glazed doors: Identical in construction, hardware and installation to solid panel doors. Design frame glazed doors to be removable for glass replacement.

**1.03 CASEWORK PERFORMANCE REQUIREMENTS**

 A. Structural performance requirements: Casework components shall withstand the following minimum loads without damage to the component or to the casework operation:

 1. Steel base unit load capacity: 500 lbs. per lineal foot.

 2. Suspended units: 300 lbs.

 3. Drawers in a cabinet: 150 lbs.

 4. Utility tables (4 legged): 300 lbs.

 5. Hanging wall cases: 300 lbs.

 6. Load capacity for shelves of base units, wall cases and tall cases: 40 lbs. per square foot

 B. Chemical Resistance Finish Performance Requirements:

 [**Specifier's Option]:** Insert chemical resistance requirements. See Appendix E.1.

**1.04 WORK SURFACE PERFORMANCE REQUIREMENTS**

 [**Specifier's Option]:** Insert here applicable performance requirements for selected work surfaces from Appendix A.

**1.05 REFERENCE STANDARDS**

1. All casework, worksurface and service fixture construction and performance characteristics shall be in full compliance with SEFA (Scientific Equipment and Furniture Association) standards. At the owner’s request, independent, third part testing must be submitted validating compliance and adheres to the architectural specifications:

	1. SEFA 1.2 – Laboratory Fume Hoods
	2. SEFA 2.3 – Installation of Scientific Laboratory Furniture and Equipment.
	3. SEFA 3 – Work Surfaces
	4. SEFA 7 – Laboratory and Hospital Fixtures

 5. SEFA 8 – Laboratory Casework

**1.06 SUBMITTALS**

 A. Shop Drawings: Provide 3/4" = 1'-0" scale elevations of individual and battery of casework units, cross sections, rough‑in and anchor placements, tolerances and clearances. Indicate relation of units to surrounding walls, windows, doors and other building components. Provide 1/4" = 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.

 B. Product Data: Submit manufacturer's data for each component and item of laboratory equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements and locations.

 C. Product Samples Upon Request: Submit for approval:

 1. Top Sample.

 2. Stainless Steel Sample

 **Include following paragraph if specifier elects to include work surface performance requirements from Appendix A.1, A.2 or A.3.**

 D. Test Reports: When requested by [Architect] [Owner], submit independent laboratory certified test reports verifying conformance to test performance specified.

 **1.07 QUALITY ASSURANCE**

 A. Single source responsibility: Casework, work surfaces, laboratory fume hood and equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.

 B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:

 1. Ten years or more experience in manufacture of laboratory casework and equipment of type specified.

 2. Ten installations of equal or larger size and requirements.

 C. Installer's qualifications: Factory trained and/or certified by the manufacturer.

 D. Cabinet identification: Cabinets are identified on drawings by manufacturer's catalog numbers. Unless otherwise modified on drawings or in specifications, catalog description constitutes specific requirements for each type of cabinet.

**1.08 DELIVERY, STORAGE AND HANDLING**

 A. Schedule delivery of casework and equipment so that spaces are sufficiently complete and that material can be installed immediately following delivery.

 B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

 C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark cardboard in large lettering "No Standing".

**1.09 PROJECT CONDITIONS**

 A. Do not deliver or install equipment until the following conditions have been met:

 1. Windows and doors are installed and the building is secure and weather tight.

 2. Ceiling, overhead ductwork and lighting are installed.

 3. All painting is completed and floor tile is installed.

# PART 2 – PRODUCTS

**2.01 MANUFACTURER**

 A. Design, materials, construction and finish of casework specified is the minimum acceptable standard of quality for stainless steel laboratory casework. The basis of this specification is Hamilton Laboratory Solutions, 825 East Albert Drive, Manitowoc, WI 54220.

**2.02 CASEWORK MATERIALS**

 A. Sheet steel: Mild, cold rolled and leveled #304 stainless steel. (#4 mill finish on all exposed surfaces)

 B. Minimum gauges:

 1. 20 gauge: Solid door interior panels, drawer fronts, scribing strips, filler panels, enclosures, drawer bodies, shelves, security panels and sloping tops.

 2. 18 gauge: Case tops, ends, bottoms, bases, backs, vertical posts, uprights, glazed door members, door exterior panels and access panels.

 3. 16 gauge: Top front rails, top rear gussets, intermediate horizontal rails, table legs and frames, leg rails and stretchers.

 4. 14 gauge: Drawer suspensions, door and case hinge reinforcements and front corner reinforcements.

 5. 11 gauge: Table leg corner brackets and gussets for leveling screws.

 C. Glass for glazed swinging and sliding doors: 1/8" (3mm) framed doors, 7/32" (6mm) unframed doors thick, clear float glass.

 D. All spot welds shall be ground smooth, cleaned and polished with no visible markings or grind marks

**2.03 CASEWORK FABRICATION**

 A. Base Units and Cases:

 1. Base units and 25", 31" and 37" high wall cases: End panels and back reinforced with internal reinforcing front and rear posts.

 2. 49" and 84" high cases: Formed end panels with front and rear reinforcing post channels; back shall be formed stainless steel panel, recessed 3/4" for mounting purposes.

 3. Posts: Front post fully closed with full height reinforcing upright. Shelf adjustment holes in front and rear posts shall be perfectly aligned for level setting, adjustable to 1/2" o.c.

 4. Secure intersection of case members with spot and arc welds. Provide gusset reinforcement at front corners.

 **Following paragraph is a casework back option for access to services behind units.**

 5. Base unit backs: Provide drawer units without backs and cupboard units with removable backs for access to services behind units.

 **Following paragraph is a casework back option for vermin protection (no access to services behind).**

 5. Base unit backs: Provide fixed backs at all drawer and cupboard units. No access to services behind.

 6. Bottoms: Base units and 25", 31", 37" and 49" high wall cases shall have one piece bottom with front edge formed into front rail, rabbeted as required for swinging doors and drawers and flush design for sliding doors.

 7. Top rail for base units: Interlock with end panels, flush with front of unit.

 8. Horizontal intermediate rails: Recessed behind doors and drawer fronts.

1. Base for base units: 4" high x 3" deep with formed steel base and 11 ga. die formed stainless steel gussets at corners. Provide 3/8" diameter leveling screw with integral bottom flange of minimum 0.56 sq. in. area at each corner, accessible through openings in toe space.
2. Tops of wall cases: One piece, with front edge formed into front rail.

 B. Drawers:

 1. Solid panel drawers: 3/4" thick, double wall, telescoping box stainless steel construction and sound deadened.

 2. Drawer bodies: Bottom and sides formed into one‑piece center section with bottom and sides coved and formed top edges. Front and back panels spot welded to center section.

 3. Drawer suspension: SEFA 8 Accuride (or equal) 150-pound full extension drawer slides, zinc coated – **[Standard Default]** **[Specifier’s Option]** a. 100- pound ¾ extension, stainless steel
 b. 150-pound full extension, stainless steel
 c. SEFA 8 100-pound ¾ extension, stainless steel
4. Provide drawer with rubber bumpers. Friction centering devices are not acceptable.

 5. Provide security panels for drawers with keyed different locks.

 6. File drawers: Provide with 150# full extension slides for full access and operation.

 C. Doors:

 1. Solid panel doors: 3/4" thick, double wall, telescoping box stainless steel construction with interior polished and sound deadened. Reinforce interior of front panel with welded stainless steel hat channels. Hinges with screws to internal 14 gauge reinforcing in case and door. Hinges shall be removable; welding of hinges not acceptable. Doors shall close against rubber bumpers.

 2. Frame glazed doors: Outer head to be one piece construction. Inner head to consist of top, bottom and side framing members which are removable for installation or replacement of glass. Provide continuous vinyl glazing retainer to receive glass. In all other respects, framed glazed door construction and quality shall match solid panel doors.

 3. Sliding doors ‑ solid or framed glazed: Design for tilt-out removal after removal of bottom guide. Doors shall be hung with nylon tired sleeve bearing rollers in formed stainless steel top hung track and shall close against rubber bumpers.

 4. Unframed sliding glass doors: Glass with edges ground set in extruded aluminum shoe with integral pulls, wheel assemblies and top and bottom extruded aluminum track. Provide rubber bumpers at fully opened and closed door position.

 D. Shelves:

 1. Form front and back edges down and back 3/4". Form ends down 3/4".

 2. Reinforce shelves over 36" long with hat channel reinforcement the full width of shelf.

 3. Pull out shelves: Same suspension as specified for drawers.

 E. Base molding: 4" high, to be furnished and installed by flooring contractor.

 F. Hardware:

 1. Drawer and hinged door pulls: Stainless steel wire pull – screws attached on 4” centers.

 2. Sliding door pulls: Recessed stainless steel styled and sized to harmonize with drawer pulls.

 3. Hinges: Institutional type, five knuckle projecting barrel hinges, minimum 2‑1/2" long, type 302 or 304 stainless steel. Provide two hinges for doors up to 36" high; three hinges for doors over 36" high. Drill each leaf for three steel screw attachment to door and frame.

 4. Door catches: Adjustable type, spring actuated nylon roller catches.

**[Specifier’s Option]** Non-metallic plunger catch

 5. Elbow catches: Spring type of cadmium plated steel, with strike of suitable design.

 6. Locks: National Lock Remove‑A‑Core 5‑disc

**[Optional: 5-pin]** tumbler, heavy duty cylinder type. Exposed lock noses shall be dull (satin) plated and stamped with identifying numbers.

 7. Keying: Locks [location shown on drawings] shall have capacity for 225 primary key changes. Master key one level with the potential of 40 different, non‑interchangeable master key groups.

 **Select above for master key, below for grand master key system.**

 7. Keying: Locks [locations shown on drawings] shall have capacity for 2000 primary key changes. Master key one level with built in flexibility to accommodate, if required, 3‑levels, 1‑Grandmaster, 59‑Master groups and 70 Sub‑master groups with 13 primary changes under each.

 8. Keys: Stamped brass available from manufacturer or local locksmith, and supplied in the following quantities unless otherwise specified:

 2 ‑ for each keyed different lock.

 3 ‑ for each group keyed alike locks.

 2 ‑ for master keys for each system.

 9. Label holders: [Locations shown on drawings] Formed stainless steel with #4 finish, 1" x 1‑1/2", screw installed.

 10. Shelf clips: Die formed, stainless steel designed to engage in shelf adjustment holes.

 11. **[Specifier's Option]**
File followers: Metal backs engaging in steel bottom channel, with spring positioning lock.

**2.04 TABLE FRAMES**

 A. Table frames: 4‑1/2" high "C" channel front and back aprons, end rails and cross rails.

 B. Table drawers: Provide front and back rails; drawer unit, hardware and suspension same as specified for base unit drawers.

 C. Legs: 2" x 2" stainless steel tube legs with welded leg bracket. Attach legs with two bolts to front and back aprons and weld to end rails. Each leg shall have a recessed leveling screw and a black, coved vinyl or rubber leg shoe, 2" in height.

 **Following two paragraphs are options; edit as appropriate for project**.

 D. Knee space frame: 2" high apron where no drawers required.

 E. Leg rails and stretchers: Channel formed.

**2.05 WORK SURFACES**

 Insert specification for selected work surfaces from Appendix A.

**2.06 SINKS, DRAINS AND TRAPS**

 Insert specification for selected sinks, drains and traps from Appendix B.

**2.07 LABORATORY FITTINGS**

 Insert specification for selected laboratory fittings from Appendix C.

**2.08 ACCESSORY EQUIPMENT**

 Insert specification for selected accessory equipment from Appendix D.

# 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. Bolt continuous cabinets together with joints flush, tight and uniform, and 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. Where required due to field conditions, scribe to abutting surfaces.

 2. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure joints in field, where practicable, in the same manner as in factory, with dowels, splines, 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 which were not factory installed shall be set in chemical resistant sealing compound and 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. Clean shop finished casework, repair as required.

 B. Clean countertops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or oils.

**3.04 PROTECTION OF FINISHED WORK**

 A. Provide all necessary protective measures to prevent exposure 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