SECTION 123103

FLEXIBLE CASEWORK SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Design Requirements

1. Provide modular structural components for support of work surfaces, under counter cabinets, and overhead storage components which are essentially self supporting and independent of the building structure.

2. Vertical height of movable bench and table work surfaces and shelves can be adjusted with simple, positive mechanisms.

B. Performance Requirements

1. Structural performance: Provide support framing capable of withstanding the total live loads indicated for various system designs including weight applied to the top of work surface and total weight of below-counter storage units and other accessories.

2. Seismic performance: Provide modular laboratory casework system capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, Section 9, "Earthquake Loads," whichever is more stringent.

a. The Effective Peak Velocity-Related Acceleration for the Project's location is 0.128

1.2 RELATED SECTIONS

A. Sustainable design requirements and procedures including submittal requirements: Section 018111, SUSTAINABLE DESIGN REQUIREMENTS.

B. Procedures and requirements for managing and disposing construction and demolition waste: Section 017419, CONSTRUCTION WASTE MANAGEMENT.

C. Section 123100 – Manufactured Metal Casework

D. Final connections to services are specified in Division 21 and 26 and indicated on the related Mechanical and Electrical drawings.

E. Color of casework finish: Section 090600, SCHEDULE FOR FINISHES.

1.3 QUALITY ASSURANCE

A. Approval by Contracting Officer of proposed manufacturer, or suppliers, will be based upon submission by Contractor certification that, manufacturer regularly and presently manufactures casework specified as one of their principal products.

B. Installer has technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Furnish supervision of installation at construction site by a qualified technician regularly employed by casework installer.

1.4 SUBMITTALS

A. Submit in accordance with Section 013323, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Certificates:

1. Manufacturer's Certificate of qualifications specified and finish on casework.

2. Contractor's Certificate of installer’s qualifications specified.

C. Manufacturer's Literature and Data:

1. Brochures showing name and address of manufacturer, and catalog or model number of each item incorporated into the work.

2. Manufacturer's illustration and detailed description.

3. List of deviations from contract specifications.

4. Locks, each kind

D. Shop Drawings (1/2 Full Scale):

1. Showing details of casework construction, including kinds of materials and finish, hardware, accessories and relation to finish of adjacent construction, including specially fabricated items or components.

2. Fastenings and method of installation.

3. Location of service connections and access.

E. LEED Submittals: Submit in accordance with Section 018111.

1. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

2. LEED Product Data Submittal Form: Submit completed product data form provided by the Contracting Officer's Representative; certified by vendor, installer, subcontractor, and/or manufacturer as appropriate.

F. Samples:

1. Metal plate, 150 mm (six inch) square, showing chemical resistant finish, in each color.

2. One complete casework assembly, including cabinet(s) with drawers and cupboard.

3. One glazed sliding door with track and pertinent hardware. A complete cabinet may be submitted to fulfill this requirement.

4. Cabinets for subsequent installation may be submitted for above requirements.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.

B. American Society for Testing and Materials (ASTM):

1. A36/A36M-08 Carbon Structural Steel

2. A167-99(R 2009) Stainless and Heat-Resisting Chromium Steel Plate Sheet and Strip
3. A283/A283M-03(R 2007) Low and Intermediate Tensile Strength Carbon Steel Plates
4. A568/A568M-09 Steel, Sheet, Carbon and High-Strength, Low-Alloy Hot-Rolled and Cold-Rolled, General Requirements
5. A794/A794M-09 Standard Specification for Commercial Steel (CS), Sheet, Carbon (0.16% Maximum to 0.25% Maximum) Cold Rolled
6. B456-03(R2009) Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
7. C1036-06 Flat Glass

C. American National Standard Institute:
1. Z97.1-09 Safety Glazing Material used In Buildings

D. Builders Hardware Manufacturers Association (BHMA):
1. A156.1-06 Butts and Hinges
2. A156.9-10 Cabinet Hardware
3. A156.5-10 Auxiliary Locks and Associated Products
4. A156.11-10 Cabinet Locks
5. A156.16-02 Auxiliary Hardware

E. American Welding Society (AWS):
1. D1.1-10 Structural Welding Code Steel
2. D1.3-08 Structural Welding Code Sheet Steel

F. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-505-06 Series Metal Finishes Manual

G. U.S. Department of Commerce, Product Standard (PS):
1. PS 1-95 Construction and Industrial Plywood

H. Federal Specifications (Fed. Spec.):
1. FF-N-836D Nut, Square, Hexagon Cap, Slotted, Castle Knurled, Welding and Single Ball Seat
2. A-A-55615 Shield, Expansion; Nail Expansion (Wood Screw and Lag Bolt Self-Threading Anchors)

I. National Fire Protection Association (NFPA)
1. 30 - Flammable and Combustible Liquids Code.

J. Underwriters Laboratories (UL)
1. 1805 Laboratory Cabinets.

PART 2 - PRODUCTS

2.1 TABLE-BASED BENCHES

A. Modular System Description
1. Made of tubular style framing combined with oval formed steel upright.
2. To be used in island, wall or peninsula situations.

3. Tubular Frames: Table and shelves supports.
4. Table supports to be adjustable height in 2″ increments.
5. Table support frames to have levelers equipped.
6. Provide a movable cabinet stop rail underneath the back of the table.
7. Integral rear and tubular frame to be used for carrying services and electrical conduit.
8. Rear upright supports to be equipped with slots for adjustable shelving and levelers.
9. All services must terminate at the top of the rear tubular support frame.
10. Assembled frame to be self supporting without needing to be anchored to the building.
11. The modular system must ship complete from the factory with minimal on-site assembly.

B. Wall Series Rear Support Structures

1. Nomnal table frame dimensions:
   a. Width: 42″, 48″, 60″, 72″
   b. Depth: 2″
   c. Heiight: 84″
2. Rear and Center Uprights:
   a. 2″ outside diameter 11ga. Painted or Stainless Steel
   b. Center uprights apply to units 60″, or 72″ wide to accommodate split shelving.
   c. Stainless steel 3/8″ x 2-½″ long levelers.
3. Upper and Lower Cross Rails:
   a. 11 ga. Painted Steel
   b. Load Capacity: Rear Upright to support up to 3 shelves loaded to a maximum of 180lbs per 12″ deep shelf. The total load capacity for the Rear Upright is 540lbs.
4. Uprights to house services, electrical and data cables.
5. High/low voltage cabling to be in a separate upright from gas piping.
6. Lower cross rail shall house an electrical circuit raceway.
7. Rear posts have slots punched on 1″ increments starting at nominal 59″ above the finished floor, to the top of the post.

C. Island Series Rear Support Structure:

1. Nominal table frame dimensions:
   a. Width: 48″, 60″, 72″
   b. Depth: 6″
   c. Height: 84″
2. Rear and Center Uprights:
   a. 2″ x 6″ 14ga. Painted or Stainless Steel
   b. Removable end panels shall be ordered separately.

c. Center uprights apply to units 60", 72" or 96" wide to accommodate split shelving.

d. Stainless steel 3/8" x 2-½" long levelers.

3. Upper and Lower Cross Rails:

a. 11ga. Painted Steel

b. Load Capacity: Rear Upright to support up to 3 shelves loaded to a maximum of 180lbs per 12" deep shelf. The total load capacity for a single sided Rear Upright is 540lbs. The total load capacity for a double sided Rear Upright is 1080lbs.

c. Uprights to house services, electrical and data cables.

d. High/low voltage cabling to be in a separate upright from gas piping.

e. Lower cross rail shall house an electrical circuit raceway.

f. Rear posts have slots punched on 1" increments starting at nominal 59" above the finished floor, to the top of the post.

4. Tubular Table Assembly:

a. Nominal table assembly dimensions:

b. Width: 48", 60", 72"

c. Depth: 29" or 35"

d. Height: Adjustable from 31" – 37" (not including work surface)

5. Tubular Table Legs:

a. 2" outside diameter, 11ga. Painted or stainless steel outer leg

b. 1-¾" outside diameter, 11ga. Painted or stainless steel inner telescoping leg

c. Stainless steel clad 1-½" diameter round adjustable leveling toe.

1) Capable of vertical height adjustment in 2" increments.

2) Table assembly shall be fastened to the rear upright with two (2) hex 5/16" socket head bolts

3) Leveling Bolt: Frame shall be fitted with a leveling bolt which will allow the legs to be adjusted for proper alignment of work surface height.

4) Load Capacity: Table frame shall support the work surface plus 100lbs/linear ft of table length up to a maximum load rating of 800lbs.

D. Natural gas, Compressed Air and Vacuum Fixtures:

1. Rear upright structure to support a maximum of three plumbing fixtures.

2. Fixtures shall be Needle Valve style with a single serrated hose end.

3. Plumbing lines shall be copper tubing running the length of the upright.

4. All burning gas tubing shall be specified as stainless steel.

5. All plumbing shall have quick disconnect at the top of the upright.

6. Plumbing shall be arranged in such a fashion that the services cannot be intermixed.

7. All service valves and quick disconnects shall be keyed and color-coded. Only plug and body connects of the same key will couple and allow flow.

   a. Service-Fixture Color-Coding: Color-code service fixtures as follows:

Service	**Color**
Air	Orange
Gas	Dark Blue
Vacuum	Yellow

   b. Provide white opaque coiled hose connectors between top of table upright to ceiling service panel with quick disconnects at both ends.

   c. Service Connections:

      1) Electrical, and Data services shall terminate at the top of the rear support upright.

E. Electrical services consist of:

1. Island Series Table (near desks): four, 20 amp circuits per double-sided table, with two , 2 circuit 20 amp cord and one, 2 or 3 circuit – 20 amp cord extending approximately 3’ to 4’ above the top of the upright. (See diagram for outlet configuration and conductor sizes)

2. Island Series Table (near ghost corridor): five, 20 amp circuits per double-sided table, with one , 2 circuit 20 amp cord and one, 3 circuit 20 amp cord extending approximately 3’ to 4’ above the top of the upright. (See diagram for outlet configuration and conductor sizes)

3. Wall Series table (near desk): two, 20 amp circuits per single-sided table, with one, 2 circuit 20 amp cord extending approximately 3’ to 4’ above the top of the upright. (See diagram for outlet configuration and conductor sizes)

4. Wall Series table (near ghost corridor): three, 20 amp circuits per single-sided table, with a one, 3 circuit 20 amp cord extending approximately 3’ to 4’ above the top of the upright. (See diagram for outlet configuration and conductor sizes)

5. 2500 watts continuous duty power cord for plug connection to overhead ceiling service panel

6. Provide pre-wired power raceway, integral in lower cross rail, to run full width of table-based bench assemblies. Include the following features:

   a. Power strip with one, 20 amp branch circuit per side of bench, with 120 volt receptacles equally spaced at no more than 18” apart.

   b. One data receptacle (at non gas service side) per integral raceway.

7. Provide one additional 20 amp 120 volt receptacle per table side at non gas service rear support upright per side of bench.

8. Provide one additional 20 amp 120 volt receptacle at bottom (18" A.F.F.) of rear support upright near the ghost corridor.

9. Refer to Specification Section 262726 "Wiring Devices" for receptacle type and color.

F. Data services shall have a male plug extending approximately 6' above the top of the upright.

1. Provide a 20 foot patch cord. Coil excess cable neatly above bench.

a. Factory assembled patch cords with ends attached (from Hubbell) must be capable of being routed through furniture raceway.

2. Provide pass through coupler and furniture plate.

a. If pass through coupler and furniture plate differ from specifications they must be approved by Owner before acceptance.

G. Bench assembly to be UL approved.

2.2 CEILING SERVICE PANELS:

A. Panels shall be compatible with most T-grid acoustical suspended ceiling structures.

B. Panel shall provide a means to mount and disconnect quick connect service fixtures, electrical and data outlets.

C. Panel shall accommodate single sided and back to back bench configurations.

D. Panels ship with electrical outlets, service fixtures, junction boxes and cover plates. (Data outlets will be furnished by Owner.) Junction boxes are to be provided by the casework manufacturer.

E. See diagrams for junction box sizes and outlet configuration.

F. Panels shall be: 18 gauge cold rolled steel with a powder coated painted finish.

G. Sizes:

1. For Island Series Rear Support Structures: 11-3/4 inches x 23-3/4 inch x 1 inch.

2. For Wall Series Rear Support Structures: 7 ¾" inches x 23-3/4 inches x 1 inch.

3. Provide cross framing and reinforcing as required for support.

2.3 ADJUSTABLE SHELVES:

A. Nominal shelf dimensions:

1. Width: 30 inches, 36 inches, 48 inches.

2. Depth and weight capacity: 6-, 8- or 12-inch; 18-inch; 130 lb; 24-inch; 100 lb.

3. Thickness: 1 inch.

B. Shelf requirements:

1. Shelves shall be constructed of powder coated cold rolled steel, capable of being locked into position.

2. Shelves, hat channel supports and separate shelf lip: 18 gage cold-rolled steel.

3. Shelves shall have a 1 inch overhang behind the face of the rear tubular posts.
4. Shelf brackets rise above the shelf surface to provide sides to be constructed of 11ga. powder coated cold rolled steel or stainless steel.
5. Shelves shall have a rear 1 inch high retaining lip.
6. Vertical shelf adjustment in 1 inch increments
7. Front of Shelves: 1 inch tall x 5/16 inch dia. retainer rods, available in #304 stainless steel
8. Wall Frame Assemblies for adjustable shelves shall be constructed of powder coated cold rolled steel, and shall be composed on vertical members with one inch slotted standards and horizontal members spanning at top and bottom of vertical standards. Horizontal members shall me mechanically fastened into the vertical members in order to transfer torque forces.

2.4 CEILING SERVICE CARRIER (WINGS):

A. Carriers deliver plumbed and wired services from above.

B. Carriers shall provide a means to mount and disconnect quick connect service fixtures, electrical and data outlets.

C. Carriers consist of both horizontal service carrier bodies and vertical umbilical assemblies used for supporting and mechanical feeding services from above the ceiling to the carrier body.

D. Carriers ship with pre-piped and pre-wired electrical outlets, service fixtures, and junction boxes. Junction boxes are to be provided by the casework manufacturer.

E. Unused fixture holes shall be plugged with ABS plastic caps and electrical cover plates.

F. Carriers shall be:

1. 18 guage cold rolled steel with a powder coated finish.
2. Carrier shall be similar to the Nautalus service center, with the shape of carrier resembling an airplane wing in cross section.
3. Sizes:
   a. Width: 18”
   b. Length: 5’ long sections as indicated on drawings
   c. Include all splice carrier connector assemblies / hardware necessary to assemble configuration as shown in the drawings.

2.5 MOBILE STORAGE UNITS (MOBILE BASE CABINETS)

A. General

1. Nominal dimensions: 27 13/16 inch height without add-a-drawer, 21-5/8 inch deep, widths as indicated,
2. Inset steel construction body with wood door and drawer fronts. Exterior members in same plane without overlap.
   a. Refer to Section 123200 for wood requirements. *(ADD#01)*
3. Steel cabinets with heavy-duty 3 inch rubber single-wheel casters with locks and foot brakes.

4. Steel, chemical resistant high-pressure laminate faced, removable extended work surface capable of being reinserted at top of cabinet or add-a-drawer unit. The ability of the work surface to be removable and reinserted at the top of cabinet or add-a-drawer unit is as applies to the manufacturer. Chemical resistant plastic laminate color to per the Schedule.

5. Each cabinet equipped with anti-tipping counterweight.

6. Removable add-a-drawer feature on drawer and cabinet units as shown in drawings.

7. Retracting grab bar handle

8. Drawers with integral locking device.

9. Door cabinets with adjustable split depth shelf.

10. Paint color: Per the Schedule.

2.6 HEAVY DUTY MOVEABLE TABLES

A. Four-Leg Adjustable-Height freestanding movable table capable of supporting suspended base cabinets.

B. Table construction consisting of corner legs and stretchers capable of supporting 1,000 of live load.

C. Stretchers located at sides and rear of table frame in order to allow for suspended cabinets or movable storage units to be stored under the table.

D. Intermediate vertical supports shall not interfere with electrical outlets located at bottom center of adjacent movable bench at ghost corridor locations.

E. Construction:

1. Nominal dimensions: as indicated.

2. Work surface support frame: 11 gage cold-rolled steel square tubing. Cabinet support channels: 14 gage cold-rolled steel. Weld members using the inert gas process.

3. Support arms: 11 gage cold-rolled steel.

4. End caps: Flame resistant ABS plastic, color matched.

5. Casters: Zambus

2.7 TASK LIGHTS

A. LED light source for low profile, discreet under shelf/cabinet placement with magnet mounting option to securely adhere to the underside of adjustable, metal shelving units. Variable light fixture lengths accommodate varying shelf lengths.

B. Equipped with individual, integral occupancy sensor/photosensor

C. Power: 120V with plug directly into US standard wall plugs

D. Power factor: .99 @$_0$ 120 VAC

E. Light Characteristics:

1. Beam Angle - 110

2. Efficacy: (IM/W) – 46.0

3. CRI: 88

4. Lumen maintenance: >49,000 L70 @ 50C

5. Color Temperature: 4000 K

6. Housing: White Painted metal
7. Lens: Diffuser Polycarbonate
8. Dimensions: 1.7” height x 2.5” Depth x variable (Shelf length minus 4” approximately)
9. Certification: UL/cUL, FCC Class A, ENERGYSTAR

2.8 METAL FINISH

A. After fabrication and before finishing, clean and treat sheet steel to prevent corrosion and to provide proper bond of the finish.

B. Apply a prime coat baked on and sanded smooth and a synthetic enamel or resin base finish system baked on. Provide a finish for surfaces exposed to view on exterior and interior of cabinets which complies with performance requirements for moisture and chemical resistance specified in Section 12305 and is smooth, semi-matte finish, evenly covered without short or thin coating on corners, runs, sags, or roughness.

C. Color: as indicated on each section above.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection

1. Protect the Work and adjacent construction from damage during installation and subsequent operations under the Contract.

3.2 DELIVERY

A. Deliver casework systems in two stages:

1. Deliver fixed casework and fume hoods.
2. Deliver flexible casework systems.

B. Deliver flexible casework systems just prior to building occupancy, as instructed by Architect.

3.3 INSTALLATION

A. General

1. Install casework and fume hoods in accordance with manufacturer's instructions and approved Shop Drawings, and under the supervision of the manufacturer's trained personnel.
2. Casework:
   a. Completely install casework less installation of mechanical and electrical service fixtures and final connection to services.
   b. Installation of service fixtures and final connection to services are specified in Divisions 22 through 26.

B. Casework Assemblies:

1. Assemble cabinets in the field with provision for future relocation, connected together with concealed bolts and set level and in alignment.
2. Install leg shoe on each table leg.

3. Provide all fastening devices, supports, adhesive and fillers required for a complete installation, including the following:

   a. Metal grounds bolted to stud partitions for support of wall cabinets.

   b. Hanger supports for sinks.

   c. Bolts and expansion shields for items connected to masonry walls.

   d. Strut assemblies for support of fume hood superstructures or other heavy equipment and for drain troughs and piping.

   e. Closure panels to ceiling, exposed ends closed.

   f. Fillers required to enclose space between wall and cabinets or fume hoods.

4. Provide holes and cutouts required for installation of equipment indicated to be mounted to casework, including items furnished under other Sections and items indicated to be not included in the Contract. Coordinate location of utilities.

5. Provide galvanized backer plates at toe kicks to receive applied base where floor elevation deviations cause gaps over one inch between bottom of cabinet base and floor.

6. Coordinate with installers of wood blocking or metal reinforcing in stud partitions to correctly locate the blocking/reinforcing.

C. Countertops and Sinks:

1. Anchor tops to base cabinet (or support structure) and knee space assemblies utilizing a construction adhesive such as "Liquid Nail" or a Ply 400/Ply 200 adhesive. Install drain troughs and sinks and sealant required to seal against tops. Remove plastic coating from stainless steel surfaces.

2. Use epoxy sealant for molded resin tops and sink plugs and silicone sealant for stainless steel tops and sink plugs.

3. Installation of sink fittings is specified in Division 22. Install sink plugs and fill annular space around top of sink plugs with sealant.

4. Set backsplashes and curbs in a full bed of adhesive. Seal joints in tops, backsplashes and curbs with adhesive.

5. Seal the following joints with silicone sealant:

   a. Joints between backsplashes and vertical surfaces, including partitions and column enclosures.

D. Accessory Equipment:

1. Install accessory equipment ready for final connection to services.

3.4 ADJUSTING

A. Make final adjustments required for proper operation as determined by the Architect.

B. Level and adjust all flexible casework systems (tables and movable benches) once these systems are placed in their designated locations.

3.5 CLEANING

A. Following completion, clean finished surfaces and leave work free of imperfections. Touch up damaged finish equal to original condition as approved.

3.6 CONSTRUCTION WASTE MANAGEMENT

A. General: Comply with Contractor's Waste Management Plan and Section 017419, CONSTRUCTION WASTE MANAGEMENT.

B. To the greatest extent possible, separate reusable and recyclable products from contaminated waste and debris in accordance with the Contractor's Waste Management Plan. Place recyclable and reusable products in designated containers and protect from moisture and contamination.

END OF SECTION