SECTION 12 35 53

FLEXIBLE LABORATORY FURNITURE SYSTEM (CAMBRIDGE BENCH)

PART 1 – GENERAL

Summary:
This Specification identifies the minimum material and construction standards that are required to deliver a quality installation of the flexible laboratory furniture system. Laboratory furniture shall be supplied in accordance with the requirements of this Specification. The laboratory furniture identified in this Specification shall include the miscellaneous metal panels and other related components as identified on the drawings and that are necessary for the complete installation.

1.1 SECTION INCLUDES

A. Structural Table Base, Shelves and Accessories
B. Under Bench Storage Cabinets
C. Fixtures and related Service Connections

1.2 RELATED SECTIONS

A. Division 06 Section 10 00, “Rough Carpentry”
B. Division 06 Section 40 00, “Architectural Woodwork”
C. Division 11 Section 53 00, “Laboratory Equipment”
D. Division 12 Section 36 00, “Countertops”
E. Division 12 Section 35 53, “Manufactured Metal Casework
F. Division 12 Section 32 13, “Manufactured Wood Casework”
G. Division 22 Section 40 00, “Plumbing Fixtures”
H. Division 26 Section 05 00, “Common Work Results for Electrical”
I. Related Work To Be Performed By Others:
    1. Final installation and connection of all plumbing, service and electrical fixtures attached to service panels or carriers.

1.3 REFERENCES

A. ISO 9001:2015 – Quality Management International Standards Organization (ISO)
B. ADA (ATBCB ADAAG) Americans with Disabilities Act Accessibility Guidelines
C. UL962A Underwriters Laboratory - Furniture Power Distribution Units

1.4 SUBMITTALS

Refer to Section 01 33 00, “Submittal Procedures,” for requirements, procedures, etc.

A. Product Data:
    1. Drawings to include data and details for construction of the laboratory furniture. Further, provide name, quantity, type and construction of materials (such as hardware, gauges, etc).

B. Shop Drawings:
    1. Provide shop drawings showing the layout and placement of all products by this section.
    2. Show the type and location of all service fittings by this section.
    3. Preparation instructions and recommendations.
    4. Storage and handling requirements and recommendations.

C. Selection Samples:

1. Submit: one complete set of color chips showing the manufacturer's full range of colors. Minimum sample size: 2" x 2-1/2".

D. Quality Assurance/Control
   1. Design Data/Test Reports: Submit test data and design criteria in compliance with the project specifications.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   Provide to the Architect at least ten days prior to the bid opening:
      1. List of manufacturing facilities.
      2. Construction details depicting the materials, sizes, and methods of construction.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packaging, Shipping, Handling and Unloading
   1. Products to have packaging adequate to protect finished surfaces from soiling or damage during shipping, delivery, and installation.
   2. Delivery: Product delivery to take place after painting, utility rough-ins and related activities are completed that could otherwise damage, soil or deteriorate casework in installation areas.
   3. Handling: Always use proper moving equipment and personnel. Any wrapping or other method of protection to be left in place to avoid damage.

B. Acceptance at Site:
   1. Product is not to be delivered or installed until the conditions specified under Part 3, Installation, have been met.

C. Storage:
   1. Product to be stored in the area of installation. If it is necessary for product to be temporarily stored in an area other than the installation area, the environmental conditions to meet the environmental requirements specified under the Project Site Conditions article of this section.

D. Waste Management and Disposal:
   1. Remove any waste or refuse resulting from the installation of laboratory furniture products. Leave the project site broom clean and free of debris. Trash container(s) to be provided by others.

1.7 PROJECT SITE CONDITIONS

A. Building must be enclosed. Windows and doors sealed and weather-tight.

B. An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place.

C. Adjacent and related work to be complete.

D. Ceiling, overhead ductwork and lighting must be installed.

E. Site must be free of any further construction such as "wet work".

F. Required backing and reinforcements must be installed accurately, and the project must be ready for furniture installation.

1.8 WARRANTY

A. Furnish a written warranty that work performed under this section to remain free from defects as to materials and workmanship for a period of two (2) years from date of shipment. Defects in materials and workmanship that develop within this time are to be replaced without cost or expense to the Owner.

B. Defects include, but are not limited to:
   1. Ruptured, cracked, or stained coating
   2. Discoloration or lack of finish integrity
   3. Cracking or peeling of finish
   4. Slippage, shift, or failure of attachment to wall, floor, or ceiling
   5. Weld or structural failure
   6. Warping or unloaded deflection of components
   7. Failure of hardware

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer:
   1. New England Lab® (NEL)
      a. Boston Corporate Offices - 1 Arrow Drive Woburn, MA 01801
         1.(888) 635-2080
      b. Baltimore Office - 2707 N. Rolling Road Suite 110 Baltimore, MD 21244
         1.(410) 944-7060
      c. North Carolina Office - 2175 Presidential Drive Suite 130 Durham, NC 27703
         1.(919) 469-8054
      d. For pricing - info@newenglandlab.com
      e. For product questions – Rand Weyler - rand@newenglandlab.com

   2. Other manufacturers that comply with the minimum thicknesses of material and similar construction appearance and quality as specified and shown in drawings.

B. Substitutions:
   1. Must meet all specification requirements, material thicknesses, manufacturing processes and have prior approval.

C. Requests for substitutions:
   1. All requests will be considered in accordance with provisions of Section 01 60 00.

2.2 MATERIALS

A. Sheet Steel: Mild steel, cold rolled furniture grade to requirements of ASTM A1008/A1008M, Grade C or higher.

B. Stainless Steel: to ASTM A240, T304 and T316 alloy, #4 brushed finish.

2.3 DESIGN REQUIREMENTS:

Basis of design: Cambridge Bench System by New England Lab®

A. Modular system to be made of tubular style framing combined with tube steel or rectangular formed steel uprights.

B. Tubular Frames / Table Supports to be adjustable height in 1" increments and complete with levelers or casters.

C. Removable rear uprights to be used for carrying plumbing services, electrical and data raceways, shelving, and accessories.
    1. Rear upright supports to be equipped with slots for adjustable shelving and accessories.
    2. All plumbing services supplied with hose and quick disconnect to reach ceiling panel supply.
    3. Electrical and Data outlets shall be supplied via corded raceways mounted on an adjustable-height mounting rail, or prewired in an existing UL approved upright.

D. Assembled bench to be self-supporting without needing to be anchored to the building.

E. Bench shall support storage cabinets that are removable and relocatable.

F. The modular system must ship complete from the factory with minimal on-site assembly.

G. Casters and levelers must be interchangeable without affecting a 30" to 37" height range when a 1" thick worktop is used.

2.4 Cambridge Bench System Construction

A. Style Cambridge Bench (TOD/TAD) Series: H-Leg Dual Bolt-Adjustable Height Workstation:
    1. Construction: All-welded frame construction of 16 gage apron and 2 inch square tubing creating a full perimeter frame capable of supporting an evenly distributed 1,000 pound load across the full 1" thick worksurface.
    2. Legs: 16 gauge, 2 inch square exterior tubing with interior sliding tube, threaded at 2 inch increments for dual bolt height adjustment. Connections into 2" threaded fittings shall allow for height adjustments on 1" increments. Interior sliding tube shall be enclosed at one end with a threaded insert plate. Threaded insert plate for interchangeable casters and levelers shall be **welded** to the bottom of the table legs. Insert leg finish shall match the table finish.
    3. Provide adjustment that allows for 30 to 37 inch table heights while on casters or levelers. Casters and levelers shall be interchangeable without affecting table height adjustment range of 30"-37".
    4. Provide Casters: 4 by 1-1/4 inch polyurethane wheels with dual locking mechanism for locking both swivel and wheel. Provide caster with minimum 250 pound load capacity per caster. Provide casters attached to tables where indicated on drawings.
    5. Provide 4 adjustable levelers attached where indicated on drawings. Provide non-marring nylon leveling pad on each leveler.
    6. Provide holes in rear legs for attachment of shelving uprights.
    7. Intermediate Hanging Rail: 16 gage steel for suspended cabinet installation.
    8. Lower Cross Members: 16 gage steel tubing
        a) Cross Rail Location: Rear
        b) 1" x 2" Cross members welded to exterior steel tubing to create an "H" leg.
    9. All steel parts to have a powdercoat finish passing SEFA 8M chemical resistance testing. Where tables are indicated as stainless steel on drawings or schedule, provide type 304 stainless steel with a #4 brushed finish instead of powdercoated steel.

B. Standard Vertical Slotted Uprights:

1. Provide 1.625" x 1.625" x 54" tube steel uprights, with slots for adjustable shelving brackets adjustable on 1" increments. Uprights shall include dual cross bracing sized to allow an electrical cord to pass behind the shelves when benches are back to back. Vertical uprights shall allow for up to three plumbing services within the standard post. Unused plumbing service holes shall be capped with white plastic or powdercoated steel caps. Single posts shall be provided with all three plumbing service holes or no plumbing service holes as required. Each left hand and right hand post shall be replaceable to add/upgrade or remove plumbing services when needed, or to allow the user to configure onsite. Cross supports are removable so that posts can be reconfigured without having to purchase the entire shelving frame assembly.

C. Plumbing – Basis of Design Manufacturer Broen-Lab. Provide products that do not require onsite plumbing connections below the ceiling pan. Provide quick connect fittings with double-shutoffs except for vacuum, which will have single shut-off quick connect fittings. At bench post, utilize flexible rear wall connection (RWC) by Broen Lab for simple removable and replaceable valve reconfiguration. System shall allow for a completed installation, with the ability to choose the valve style and configuration at a later date.

a) All plumbing products shall be color-coded using US standard colors for their specific service to ensure proper installation. Quick connects shall be keyed so that they cannot be inadvertently connected.

b) Valves shall be removable from the bench post's RWC connector with two set screws so that they can be swapped with different valve products including ADA compliant valves, regulator valves, or double valves in the future, or can be capped when not required. Set screws shall also allow for the valves to be rotated from 0 to 360 degrees to achieve the desired handle location angle.

c) Fixtures to be needle valve style with a single serrated hose end. Fixture finish to be Bright White **[9090 satin gray metallic]** with a clear lacquer of powder coat for extra protection. Valves shall have color coded polyethylene bonnet style handles.

1) Needle valves can be swapped out with a ¼ turn ball valve in less than 5 minutes without special tools or skills making any bench plumbing ADA compliant in a few minutes.
2) [Provide ¼ turn ball valves where indicated on drawings]
3) [Provide one of each valve in ¼ turn ball valve style to be swapped in at a later date when required]

d) In order to achieve maximum safety provide a double sealing connection with an O-ring and a conical shape metal seal. Number of connection points shall be minimized.

e) Provide standard pre-plumbing kit designed for the Cambridge Bench System
1) Pre-plumbing kit shall function as a tube endcap and contain three quick connect fittings for connections to hoses that extend to a quick connect in service panels above. Provide set screw in tube endcap to prevent the kit from being inadvertently removed.
2) Services shall be identified from top to bottom, up to three per kit. Common kits:
1. Nit, Air, Vac
2. Special Gas, CO2, O2
3. [Other]

OR

f) **[Provide direct line plumbing using white polyethylene hoses and extending 14' from the valve directly to the ceiling panel without quick connects at the top of the bench post]**

D. Upper Electrical Raceway Mounting Rail: Designed to accept PG Lifelink 130 series pre-wired raceway with white cordset. Provide powdercoated steel adjustable height mounting rail suitable for mounting an electrical raceway. Mounting rail connects to slotted uprights without fasteners. Mounting rail shall be pre-punched with holes for mounting separate raceways. Mounting rail shall be set back so that the raceway can be recessed at least 1" back from the face of the uprights.

E. Lower Electrical Raceway Mounting Rail: Designed to accept PG Lifelink 130 series pre-wired raceway with white cordset. Provide powdercoated steel lower electrical mounting rail suitable for mounting an electrical raceway. Mounting rail connects to rear legs under worktop with fasteners. Mounting rail shall be pre-punched with holes for mounting separate raceways.

.

a) Mounting rail shall be flush-mounted to the face of the rear legs and have a rear-facing 2" deep wire management trough. Trough is ¾" deep along the open back side, and 3" high. Trough shall have 1.25" x 2" rectangular hole cutouts 3.5" on center for wire management along the entire length.
b) Lower Electrical Rail can be used with or without removable uprights. When used without uprights secure with bolts, washers and acorn nuts using the hole designated for removable uprights. Do not make extra holes in table frame unless drawings specifically indicate a custom height location.
c) Lower mounting rail uses the same fastener that secures the uprights so that no additional holes are required in the table frame. Bolts shall be loosened and not removed in order to secure the mounting rail.
d) Mounting rail shall be notched up from the bottom so that bolt fasteners do not need to be removed in order to remove or install the mounting rail.

F. Electrical Raceways: Basis of Design PG Lifelink 130 series pre-wired raceway with white cordset designed specifically for flexible use on the Cambridge Bench.

a) All raceways available above the worksurface shall fit and be interchangeable with any raceways below the worksurface for user flexibility. All raceways shall fit either upper or lower mounting rails.
b) Provide a 20A UL962A approved anodized aluminum raceway designed specifically for the Cambridge Series Bench System. UL approval must be by a Nationally Recognized Test Lab (NRTL) such as ETL and labeled as such.
c) Provide a minimum of 5 pre-wired duplex outlets regardless of raceway length for all standard sized benches. (10 outlets total)
d) Raceway shall be designed so that the pre-wired power cord can exit on the left or right side of the raceway in the field. A cord path shall allow the cord(s) to travel up behind the shelving crossbars along the inside of the slotted upright. Benches can be placed back to back or against a wall and the cord(s) shall not interfere with the bench placement.
e) Raceway shall be designed so that the raceway cover does not need to be removed to attach the raceway to the mounting rail. Fasteners may only be visible from the rear of the mounting rail.

f) Ensure that outlets are mounted beyond the distance of the plumbing fixture handles from either end so that power cords extending down from outlets do not interfere with actuating the plumbing fixture.

g) Include single circuit 10' long L5-20P (twistlock) white cordset for connections at ceiling, or 5-20P (straight blade) cordset for connections at wall or floor as indicated on drawings or bench schedule.

h) [Include two circuits and a 10' long L14-20P white cordset, and increase the number of duplex fixtures to a minimum of 6 when table is less than 72" and 8 duplex when 72" or larger. Alternate the circuits so that every other duplex is on the same circuit. Share neutral and ground wires]]

i) Provide Data in Electrical Raceway as indicated on drawings

1) Include divider panel in raceway to keep power and data separate. Provide access port in end of raceway, and shorten raceway by 2" to allow for cord radius.

2) [Provide two female port cat6 connections in the power raceway. Provide 14' cables with male ends for connection to the ceiling panel.]

3) [Provide data cutout only in the power raceway.]

j) Provide data in upright as indicated on drawings

1. Provide cutout only, with blank plastic cap for installation of data by others

2. [Provide 2 cat6 data female connection ports and 14' cables with male ends for connection to the ceiling panel.].]

G. [Provide Aluminum Slat Rail (toolbar)

1. Provide a 3 ¾" high by 1" thick anodized extruded aluminum dual channel slatwall rail. Rail shall be sized to fit between uprights. Basis of Design: Novus slatwall rails by Dahle North America.

a) Rails may be mounted so that the face of the rail is flush with the face of the uprights (Flush-Mount), or so that the rear of the rail is flush with the face of the uprights (Forward-Mount). Either shall be accomplished with the same mounting bracket and hardware, and additional molded plastic inserts shall be provided to finish the ends of the rails when rail ends are exposed in Forward-Mount applications.

b) Mounting bracket shall engage both slots in the slatwall rail, and have a tooth pattern to match the slotted upright system. Provide set screw to engage into empty upright slot and prevent bracket from lifting up or being removed when engaged.

c) Provide t-nut mounting hardware and required hex bolts to fasten bracket to slat rail.

d) [Monitor Arm: Provide slatwall-mounting monitor arm that engages double slots on rail, and is tightened to the rails with a single top-mounted hex head bolt. Swivel range of 180 degrees. Provide quick release monitor mounting bracket with 75mm and 100mm mounting options. Suitable to support monitors 4.5lbs to 15lbs with a gas technology spring. Basis of Design Novus Clu 1]

H. Shelving hardware:

1. Provide bookend brackets and powder coated steel hat channel reinforced shelving for use with slotted uprights.
2. Steel shelving shall support 40lbs per linear foot up to 180lbs maximum.

I. Cambridge Style TWE (MOTOR): H-Leg Hydraulic Workstation:

1. Construction: All-welded construction of 16 gauge apron and 2 inch square tubing creating a full perimeter frame capable of supporting an evenly distributed 1,000 pound load. 96" wide tables rated at 500 pounds. Bolt-together table frames are not acceptable.
2. Legs: 2 inch square tubing with electric motor, hydraulic leveling mechanism and elastomer floor contacts. Provide height adjustment from 30 to 37 inches.
3. Provide hydraulic piston lift system or spindle drive lift system
4. Intermediate Hanging Rail: 16 gauge steel for suspended cabinet installation.
5. Cross Members: 16 gauge steel tubing.
6. Cross Rail Location: Rear

7. 9.5' 3 prong 120V power cord, black.

J. Cambridge Style TWD (HAND CRANK): H-Leg Hydraulic Workstation:
1. Construction: All-welded construction of 16 gauge apron and 2 inch square tubing creating a full perimeter frame capable of supporting an evenly distributed 1,000 pound load. 96" wide tables rated at 500 pounds. Bolt-together table frames are not acceptable.
2. Legs: 2 inch square tubing with hand-crank, hydraulic or spindle drive leveling mechanism and elastomer floor contacts. Provide height adjustment from 30 to 37 inches.
3. Intermediate Hanging Rail: 16 gauge steel for suspended cabinet installation.
4. Cross Members: 16 gauge steel tubing.
5. Cross Rail Location: Rear

1.2 WORK SURFACES

A. Plastic Laminate Work Surface: 1 inch thick medium density particleboard core with .050 inch thick high-pressure laminate on top surface, phenolic backer sheet, and 3 mm matching PVC edge treatment. Laminate color as selected by the Architect from manufacturer's standard options.

B. Epoxy Resin Work Surface: 1 inch thick, factory molded modified epoxy-resin formulation, uniform mixture throughout full thickness with smooth, non-glare finish. Finish edges with an 1/8 inch bevel and drip groove. Provide color as indicated on drawings or finish schedule from manufacturer's standard options.

C. Phenolic Work Surface: 1 inch thick phenolic resin sheet. Monolithic panel made from kraft paper or wood fibers saturated in phenolic resin that is heated, compressed and finished on at least one side. Color as selected by Architect from manufacturer's standard options. Provide manufacturer's chemical resistant grade.
1. Polished **color matching** edges finished with an 1/8 inch bevel
   a) Acceptable Manufacturers
      1) Fundermax
      2) Wilsonart/Durcon
2. **[Polished black edges finished with an 1/8 inch bevel.**
   a) Acceptable Manufacturers
      1) Fundermax
      2) Pionite
      3) Wilsonart
      4) Trespa]

D. Stainless Steel Work Surface: Type **[304] [316]** stainless steel tops and working surfaces with #4 finish, unless otherwise specified. Provide 16 gauge stainless steel on all exposed surfaces, reinforced on the underside by 16 gauge galvanized steel channels, so spaced as to prevent twisting, oil-canning or buckling. Form exposed edges of tops into a **[1" thick] [1 1/4" thick with marine edge]** channel shape. After fabrication and polishing, give the surfaces of the tops a strippable protective coating to protect the tops during shipment and installation. Coat the underside of tops with a sound deadener. **[Enclose the underside with a finished stainless steel panel]**

E. Butcher Block Work Surface: Rock-hard, edge grained laminated maple, electronically bonded together utilizing controlled pressure and resin adhesives.
1. Thickness: **[1-3/4 inch.] [2-1-4 inch.] [3 inch.]**
2. Edge Style: **[Straight.] [Radius edge.] [Bullnose edge.]**
3. Finish: Dura Kryl 102, acrylic wear-resistant wood finish.

A. Suspended/Mobile Base Cabinets:
   1. Design and construction to be as in section 12 35 53 - Laboratory Metal Casework and 12 35 53 – Laboratory Wood Casework.
   2. Suspended base cabinets: Provide a system of steel hanger rails attached to the casework frames. Installation and removal to be accomplished without the use of tools.
   3. Mobile cabinets to have casters in lieu of a toe kick. Casters to all be rated for 165lbs minimum each and to be locking type. Cabinet height must ensure 2-½" of clearance under the table frame.

2.5 TASK LIGHTS [OPTIONAL-SELECT ONE]

A. Provide one of the following task lights with magnetic fasteners when indicated on drawings:

   1. UCX Pro task light by Koncept
      a. Modular occupancy sensor switch
      b. User adjustable color temperature
      c. Dimming
      d. Black cords and outlet/plug mounted driver

   2. Hero task light by Mocha Lighting
      a. 4000K light temperature
      b. Built in occupancy sensor switch
      c. Stepped dimming
      d. Built in driver
      e. White cords, standard plug
      f. Daisy-chain Capable

   3. Snite task light by L&S Lighting
      a. on/off toggle switch on fixture
      b. Built in driver
      c. White cords, standard plug
      d. Daisy-chain Capable

   4. Brightedge® Portable task light by New England Lab®
      a. Built in occupancy sensor and vacancy timer switch
      b. Dimming
      c. Daisy-chain capable
      d. White cords and outlet/plug mounted driver

2.1 CEILING SERVICE PANELS

A. General Construction:

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

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

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

4. Data outlets, electrical outlets, junction boxes, cover plates and service fixtures shall be ordered separately by other trades.

5. Panels shall be 23-¾" x 23-¾" x 1", 14 gauge cold rolled steel with a powder coated finish.

2.5 STEEL FURNITURE FINISH

1. Metal finish to be as in Appendix 1 - Laboratory Steel Furniture Finish.

PART 3 – EXECUTION

3.1 INSTALLATION

1. Install casework within system, align and set level with levelling devices, in accordance with shop drawings.
2. Install components to provide a secure, neat, and complete installation.

END OF SECTION