

PROJECT MANUAL FOR:

University of Missouri Teaching Hospital
Ambulatory Surgery Unit Lab Space –
Laboratory Furniture System Procurement Package

PROJECT NUMBER:

CP171051

AT:

UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI

FOR:

THE CURATORS OF THE UNIVERSITY OF MISSOURI

PREPARED BY:

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SECTION 12 35 53 - METAL LABORATORY CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Metal laboratory casework.
2. Utility-space framing at backs of base cabinets.
3. Filler and closure panels.
4. Laboratory countertops.
5. Tables.
6. Shelves.
7. Laboratory sinks.
8. Laboratory accessories.

- B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood blocking for anchoring laboratory casework.
2. Section 09 22 16 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring laboratory casework.
3. Section 09 65 13 "Resilient Base and Accessories" for resilient base applied to metal laboratory casework.
4. Section 11 53 13 "Laboratory Fume Hoods" for fume hoods, including base cabinets and countertops under fume hoods.
5. Section 12 35 60 "Laboratory Furniture System" for mobile laboratory casework.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.

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- B. Coordinate installation of laboratory casework with installation of fume hoods and other laboratory equipment.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For laboratory casework. Include plans, elevations, sections, and attachment details.
 - 1. Indicate types and sizes of cabinets.
 - 2. Indicate locations of hardware.
 - 3. Indicate locations and types of service fittings.
 - 4. Indicate locations of blocking and reinforcements required for installing laboratory casework.
 - 5. Include details of utility spaces showing supports for conduits and piping.
 - 6. Include details of support framing system.
 - 7. Include details of exposed conduits, if required, for service fittings.
 - 8. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
 - 9. Include coordinated dimensions for laboratory equipment specified in other Sections.
- C. Keying Schedule: Include schematic keying diagram and index each key set to unique designations that are coordinated with the Contract Documents.
- D. Samples for Verification: For each type of cabinet finish and each type of countertop material, in manufacturer's standard sizes.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Test Reports for Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of specified product standard.
- C. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish complete touchup kit for each type and color of metal laboratory casework provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.

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- B. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Cabinet Mounting Clips and Related Hardware: Quantity equal to 5 percent of amount installed, but no fewer than 20 of each type.
 - 2. Modular Countertop Units: Two extra units of each length and material installed.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with SEFA 8 M.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, utility roughing-in and wet work are complete and dry, and temporary HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Kewaunee Scientific Corporation; Laboratory Products Group.](#)
 - 2. [Lab Crafters, Inc.](#)
 - 3. [Mott Manufacturing Ltd.](#)
 - 4. [Bedcolab – Addendum 004](#)
 - 5. [Hamilton Lab Solutions – Addendum 004](#)
 - 6. [Institutional Casework Inc. \(ICI\) – Addendum 004](#)
 - 7. Or equal if and as specifically approved by Architect by Addendum during the bidding period.
- B. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.

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- C. **Product Designations:** Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Other manufacturers' laboratory casework of similar sizes and similar door and drawer configurations and complying with Specifications may be considered.

2.2 CASEWORK, GENERAL

- A. **Casework Product Standard:** Comply with SEFA 8 M, "Laboratory Grade Metal Casework."
- B. **Flammable Liquid Storage:** Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with requirements in NFPA 30 by a testing and inspecting agency acceptable to authorities having jurisdiction.
- C. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 METAL CABINET AND TABLE MATERIALS

- A. **Metal:** Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.
- B. **Nominal Metal Thickness:**
 - 1. **Sides, Ends, Fixed Backs, Bottoms, Tops, Soffits, and Items Not Otherwise Indicated:** 0.048 inch (1.21 mm). Except for flammable liquid storage cabinets, bottoms may be 0.036 inch (0.91 mm) if reinforced.
 - 2. **Back Panels, Doors, Drawer Fronts and Bodies, and Shelves:** 0.036 inch (0.91 mm) except 0.048 inch (1.21 mm) for back panels and doors of flammable liquid storage cabinets and for unreinforced shelves more than 36 inches (900 mm) long.
 - 3. **Intermediate Horizontal Rails, Table Aprons and Cross Rails, Center Posts, and Top Gussets:** 0.060 inch (1.52 mm).
 - 4. **Drawer Runners, Sink Supports, and Hinge Reinforcements:** 0.075 inch (1.90 mm).
 - 5. **Leveling and Corner Gussets:** 0.105 inch (2.66 mm).

2.4 AUXILIARY CABINET MATERIALS

- A. **Glass for Glazed Doors:** Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; not less than 5.0 mm thick.

2.5 COUNTERTOP, TABLETOP, SHELF, TROUGH AND SINK MATERIALS

- A. **Epoxy:** Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish.
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

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- a. [Durcon, Inc.](#)
 - b. [Prime Industries, Inc.](#)
 - c. [American Epoxy Scientific – addendum 004](#)
 - d. Or equal if and as specifically approved by Architect by Addendum during the bidding period.
2. Physical Properties:
- a. Flexural Strength: Not less than **10,000 psi (70 MPa)**.
 - b. Modulus of Elasticity: Not less than **2,000,000 psi (1400 MPa)**.
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than **260 deg F (127 deg C)**.
3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
- a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
4. Color: Durcon: Gray ; As selected by Architect from manufacturer's full range.

2.6 METAL CABINETS

- A. Fabrication: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Except where otherwise specified, integrally frame and weld cabinet bodies to form dirt- and vermin-resistant enclosures. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of **1/16 to 3/32 inch (1.5 to 2.4 mm)**.
- B. Flush Doors: Outer and inner pans that nest into box formation, with full-height channel reinforcements at center of door. Fill doors with noncombustible, sound-deadening material.
- C. Glazed Doors: Hollow-metal stiles and rails of similar construction as flush doors, with glass held in resilient channels or gasket material.
- D. Hinged Doors: Mortise for hinges and reinforce with angles welded inside inner pans at hinge edge.
- E. Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal.
- F. Adjustable Shelves: Front, back, and ends formed down, with edges returned horizontally at front and back to form reinforcing channels.

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- G. Toe Space: Fully enclosed, 4 inches (100 mm) high by 4 inches (100 mm) deep, with no open gaps or pockets.
- H. Utilities: Provide space, cutouts, and holes for pipes, conduits, and fittings in cabinet bodies to accommodate utility services and their support-strut assemblies.
 - 1. Provide base cabinets with removable backs for access to utility space.
- I. Utility-Space Framing: Steel framing units consisting of two steel slotted channels complying with MFMA-4, not less than 1-5/8 inches (41 mm) square by 0.105-inch (2.66-mm) nominal thickness, that are connected at top and bottom by U-shaped brackets made from 1-1/4-by-1/4-inch (32-by-6-mm) steel flat bars. Framing units may be made by welding specified channel material into rectangular frames instead of using U-shaped brackets.
- J. Filler and Closure Panels: Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges unless otherwise indicated.
 - 1. Provide knee-space panels (modesty panels) at spaces between base cabinets, where indicated. Fabricate from back-to-back panels or of hollow construction to eliminate exposed hemmed or flanged edges.
 - 2. Provide utility-space closure panels at spaces between base cabinets where utility space would otherwise be exposed, including spaces below countertops.
 - 3. Provide closure panels at ends of utility spaces where utility space would otherwise be exposed.

2.7 METAL CABINET FINISH

- A. General: Prepare, treat, and finish welded assemblies after assembling. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: After assembly, clean surfaces of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply laboratory casework manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 - 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8 M. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
 - 2. Colors for Metal Laboratory Casework Finish: As selected by Architect from manufacturer's full range.

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2.8 HARDWARE

- A. General: Provide laboratory casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two for doors **48 inches (1200 mm)** high or less and three for doors more than **48 inches (1200 mm)** high.
- C. Hinged Door and Drawer Pulls: Stainless-steel back-mounted pulls. Provide two pulls for drawers more than **24 inches (600 mm)** wide.
 - 1. Design: Wire pulls.
 - 2. Overall Size: **1-1/4 by 4-1/2 inches (32 by 114 mm)**.
- D. Door Catches: Nylon-roller spring catches. Provide two catches on doors more than **48 inches (1200 mm)** high.
- E. Drawer Slides: Side mounted, epoxy-coated steel, self-closing; designed to prevent rebound when drawers are closed; complying with BHMA A156.9, Type B05091.
 - 1. Provide Grade 1HD-100; for drawers not more than **6 inches (150 mm)** high and **24 inches (600 mm)** wide.
 - 2. Provide Grade 1HD-200; for drawers more than **6 inches (150 mm)** high or **24 inches (600 mm)** wide.
- F. Label Holders: Stainless steel, aluminum, or chrome plated; sized to receive standard label cards approximately **1 by 2 inches (25 by 50 mm)**, attached with screws or rivets. Provide on all drawers.
- G. Locks: Cam or half-mortise type with five-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281, Type E07111, or Type E07021.
 - 1. Provide a minimum of two keys per lock and two master keys.
 - 2. Provide where indicated.
 - 3. Keying: Key locks as directed.
 - 4. Master Key System: Key all locks to be operable by master key.

2.9 COUNTERTOPS, TABLETOPS , SHELVES , TROUGHES, AND SINKS

- A. Countertops, General: Provide units with smooth surfaces in uniform plane, free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of **1 inch (25 mm)**, with continuous drip groove on underside **1/2 inch (13 mm)** from edge.
- B. Sinks, General: Provide sizes indicated or laboratory casework manufacturer's closest standard size of equal or greater volume, as approved by Architect.

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1. Outlets: Provide with strainers and tailpieces, **NPS 1-1/2 (DN 40)**, unless otherwise indicated.
2. Overflows: For each sink except cup sinks, provide overflow of standard beehive or open-top design with separate strainer. Height **2 inches (50 mm)** less than sink depth. Provide in same material as strainer.

C. Epoxy Countertops, Tabletops and Sinks:

1. Countertop Fabrication: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and butt joints assembled with epoxy adhesive and concealed metal splines.
 - a. Countertop Configuration: Raised (marine) edge, **1-inch (25-mm)** minimum thickness, with integral or applied raised edge having rounded edge and corners, and with applied backsplash.
 - b. Countertop Construction: Uniform throughout full thickness.
2. Sink Fabrication: Molded in one piece with smooth surfaces, coved corners, and bottom sloped to outlet; **1/2-inch (13-mm)** minimum thickness.
 - a. Provide with polypropylene strainers and tailpieces.
 - b. Provide integral sinks in epoxy countertops, bonded to countertops with invisible joint line.
 - c. Provide manufacturer's recommended adjustable support system for table- and cabinet-type installations.

D. Cup Sinks: Epoxy, **3-by-6-inch (75-by-150-mm)** oval.

1. Provide with polypropylene strainers and integral tailpieces.

2.10 LABORATORY ACCESSORIES

- A. Reagent Shelves: Provide as indicated, fabricated from same material as adjacent countertop unless otherwise indicated.
- B. Pegboards: Epoxy pegboards with removable polypropylene pegs and stainless-steel drip troughs with drain outlet.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
1. Variation of Tops of Base Cabinets from Level: **1/16 inch in 10 feet (1.5 mm in 3 m)**.
 2. Variation of Bottoms of Upper Cabinets from Level: **1/8 inch in 10 feet (3 mm in 3 m)**.
 3. Variation of Faces of Cabinets from a True Plane: **1/8 inch in 10 feet (3 mm in 3 m)**.
 4. Variation of Adjacent Surfaces from a True Plane (Lippage): **1/32 inch (0.8 mm)**.
 5. Variation in Alignment of Adjacent Door and Drawer Edges: **1/16 inch (1.5 mm)**.
- B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.
- C. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions, with fasteners spaced not more than **16 inches (400 mm)** o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than **24 inches (600 mm)** o.c. and at sides of cabinets with not less than two fasteners per side.
- D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than **16 inches (400 mm)** o.c.
- E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- F. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where indicated on Shop Drawings.
- B. Field Jointing: Where possible, make in same manner as shop-made joints, using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Shop prepare edges for field-made joints.
1. Use concealed clamping devices for field-made joints in plastic-laminate countertops. Locate clamping devices within **6 inches (150 mm)** of front and back edges and at intervals not exceeding **24 inches (600 mm)**. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.

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C. Fastening:

1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
2. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches (1200 mm) o.c.
3. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch (3 mm), and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.

D. Provide required holes and cutouts for service fittings.

E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.

F. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF SINKS

A. Comply with installation requirements in SEFA 2.3.

B. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and countertop manufacturers' recommended chemical-resistant sealing compound or adhesive, and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement. Remove excess sealant or adhesive while still wet and finish joint for neat appearance.

C. Drop-in Installation of Epoxy Cup Sinks: Rout groove in countertop to receive sink rim if not shop prepared. Set sink in adhesive and fill remainder of groove with sealant or adhesive. Use procedures and products recommended by sink and countertop manufacturers. Remove excess adhesive and sealant while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF LABORATORY ACCESSORIES

A. Install accessories according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions.

B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.

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- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.
- D. Securely fasten pegboards to partition framing, wood blocking, or reinforcements in partitions.

3.6 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect countertop surfaces during construction with 6-mil (0.15-mm) plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches (1200 mm) o.c.

END OF SECTION 12 35 53

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SECTION 12 35 60 – LABORATORY FURNITURE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Mobile Bench Frame
2. Mobile Instrument Carts
3. Suspended Base / Upper Cabinets

- B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for blocking for anchoring laboratory casework.
2. Section 12 35 53 "Metal Laboratory Casework" for fixed laboratory casework.

1.3 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.
- B. Coordinate installation of laboratory furniture with installation of laboratory casework, fume hoods and other laboratory equipment.
- C. Coordinate locations for power and data in upper carrier of mobile carts

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings:

1. For laboratory furniture. Include plans, elevations, sections, and attachment details.
2. Indicate the type and location of all service fittings and associated supply connections.
3. Indicate locations of hardware and keying of locks.
4. Indicate locations and types of service fittings.
5. Indicate locations of blocking and reinforcements required for installing laboratory casework.

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6. Include details of support framing system.
7. Include details of utility spaces showing supports for conduits and piping.
8. Include details of exposed conduits, if required, for service fittings.
9. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
10. Include coordinated dimensions for laboratory equipment specified in other Sections.
11. Preparation instructions and recommendations.
12. Storage and handling requirements and recommendations.
13. Installation Methods

- C. Samples for Initial Selection: For cabinet finishes and other materials requiring color selection.
- D. Samples for Verification: For each type of cabinet finish and each type of countertop material, in manufacturer's standard sizes.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Test Reports for Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of specified product standard.
- C. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish complete touchup kit for each type and color of metal laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.
- B. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Cabinet Mounting Clips and Related Hardware: Quantity equal to 5 percent of amount installed, but no fewer than 20 of each type.

1.7 QUALITY ASSURANCE

- A. Single source responsibility: Laboratory furniture system, casework, work surfaces, and accessories shall be manufactured or furnished by a single casework furniture company.
- B. Manufacturer Qualifications: A qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with SEFA 8.

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- C. Manufacturer to provide on request, load test results certified by and independent testing laboratory for drawers, doors, suspension slides and unit shelving.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, utility roughing-in and wet work are complete and dry, and temporary HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.10 WARRANTY

- A. Furnish a written warranty that Work performed under this Section shall 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 may develop within this time are to be replaced without cost or expense to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Sigma Cart
 1. Mott Manufacturing Ltd.; 452 Hardy Rd. Brantford, ON, Canada N3T 5L8. Tel: (519) 752-7825. Fax: (519) 752-2895. Email: inquire@mott.ca, www.mott.ca.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. [Lab Crafters, Inc.](#)
 2. [Kewaunee Scientific Corporation; Laboratory Products Group.](#)
 3. [Mott Manufacturing Ltd.](#)
 4. [Bedcolab – Addendum 004](#)
 5. [Hamilton Lab Solutions – Addendum 004](#)
 6. [Institutional Casework Inc. \(ICI\) – Addendum 004](#)
 7. Or equal if and as specifically approved by Architect by Addendum during the bidding process.

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- C. Product Designations: Drawings indicate sizes and configurations of laboratory casework. Other manufacturers' laboratory casework of similar sizes and similar door and drawer configurations and complying with Specifications may be considered. See Section 01 60 00 "Product Requirements."

2.2 MATERIALS

- A. Sheet Steel: Mild steel, cold rolled furniture grade to requirements of ASTM A1008/A1008M, Grade C or higher, with smooth surfaces to furniture quality.
- B. Galvanized Sheet Steel: Commercial quality galvanised sheet steel to ASTM 653, Designation Z275.
- C. Stainless Steel:
 - a. Sheet: ASTM A240, Type 304 AND 316 alloy.
 - b. Finish: Unless otherwise indicated, AISI No. 4 Brushed finish.
- D. Glass: Clear Float, 6 mm and 3 mm thick, conforming to CAN2 12.3-M76, Glazing Quality. Laminated Glass: CAN/CGSB-12.1-M90, Type 1 with clear PVB interlayer. Total nominal thickness of laminated glass: 6 mm.
- E. Sealant: One component, clear silicone base sealant, chemical curing conforming to CAN/CGSB-19.18-M87, anti -fungus composition. Acceptable types: "DC-786" by Dow Corning, and "Sanitary 1700" by CGE.

2.3 DESIGN REQUIREMENTS

- A. Support systems shall be a core and panel style support structure.
- B. Core structure can be supported by anchoring to suitable flooring material or may be supported by structural end gables (outrigger legs).
- C. Modular components shall be suitable for single faced wall cores or double-faced peninsula or island configuration.
- D. Core assemblies shall have removable panels on all sides.

2.4 CONSTRUCTION

- A. Mobile Bench Frame
 - 1. Rear island frame support structures:
 - a. Vertical uprights shall allow for plumbing, electrical and data cabling.
 - b. Single frame uprights, when detailed, shall be 11 ga. tubular steel 2" outside diameter. When detailed, gas piping and high/low voltage cabling shall be separated in opposite and separate vertical members.

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- c. Shared rear frame uprights, when detailed, shall be 11 ga. cold-rolled steel formed to a 2"x6" structural support with a full-height removable side cover. When detailed, gas piping shall be in the opposite and separate vertical upright from cabling. Cabled vertical upright shall have two channels to separate low voltage from high voltage cabling.
- d. Levelers are 3/8"-16 nc x 2.5" long. (1 leveler per single frame upright, 2 levelers per shared frame upright). Provide heavy duty leveling casters at all mobile carts. Footmaster model AC600F.
- e. Single and shared rear frames in wider widths (60", 66", 72") will not have a center support and will have continuous shelving, not split shelving.
- f. Uprights have slots punched on 1" increments starting at nominal 55" above the floor to the top of the upright.
- g. Upper and lower horizontal cross rails shall be 11 gauge steel for single frames and 14 gauge for shared frames. Lower horizontal rail shall occur below the worksurface when set at lowest height.
- h. Vertical uprights to serve as utility chase for mounting plumbing, data, and electrical fixtures, as detailed. Services to be pre-plumbed and pre-wired within upright design, equipped with hoses, cords, and cabling to connect to Overhead Distribution Panel. Design upright to provide metal separation between electrical wiring and data/telecom cabling. All electrical work is to be performed in a UL approved shop.
- i. Nominal dimensions:
 - 1) Width: 24", 30", 36", 42", 48", 54", 60", 66", 72"
 - 2) Height: 84"

B. Mobile Instrument Carts:

1. Nominal Dimensions:
 - a) Width: 24", 36", 48", 60", 72"
 - b) Depth: 29", 35"
 - c) Height: 78"
2. Casters: Four per cart assembly. wheels with grey non-marking tire. Each caster shall have a 300 pound min. load rating. Casters shall be equipped with a total lock (locks both wheel rotation and caster swivel). Casters shall be attached to extreme corners of the cart base by threading into welded inserts. Casters shall be heavy duty locking and levelling casters. Similar to Footmaster model AC600F.
3. Cart base assembly: Cart base assembly shall be fabricated from 1.5" x 3" rectangular tube steel of 16 gage wall thickness. Base shall be welded together with neat, professional MIG weld fillets. For maximum strength, fillets shall be left unground. Mobile cart base shall be in a "C" shape with two members across the back and one member at each end. Cart base shall be open at front to allow knee space for seated users. Vertical upright attachment members of 24" in length shall be welded to each end of the "C" shaped base. All open tube ends shall be plugged with black plastic plugs.
4. Slotted vertical uprights shall be the same construction and hole pattern as all other furniture in the same series. Slotted uprights shall be bolted to vertical upright attachment members using four 5/16" socket head cap screws. Screws shall be concealed beneath snap in plugs.

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5. All hanging components attached to vertical uprights shall be adjustable in 1" increments.
6. Mobile Instrument Cart shall accept all shelves, cantilevered work surfaces suspended case-work and upper storage cabinets designed for other furniture in the same series.
7. Fully assembled 78" high instrument cart shall support the following components. Each component has an individual maximum load, but total load shall not exceed 1000 pounds.
 - a) Shelves - 6", 8", 12" - 180 lbs.; 18" - 130 Lbs.; 24" - 100 lbs.
 - b) Wall cases - 300 Lbs
 - c) One cantilever work surfaces - 600 Lbs each (includes weight of work surface and suspended cabinets (if any)

C. Suspended Base / Wall Cabinets

1. Design and construction shall be as in section 12 35 53 - Laboratory Metal Casework.
2. Suspended cabinets shall be supported using hook shaped rails attached near the front and rear of the cabinets. It shall be possible to remove and relocate a fully loaded cabinet to any position between legs.
3. Suspended wall cases: Provide a system of cold-rolled steel hanger rails attached to the casework frames, to be vertically adjustable on one inch increments. Installation and removal to be accomplished without the use of tools.
4. Reagent Shelving: Provide front and side safety edge material.

D. Suspended CPU Holder:

1. The CPU holder shall be suspended from standard system furniture using compatible hanging rails. It shall consist of a 14 gauge steel "U" shaped channel connected to a 14 gauge steel inverted "U" shape top channel. The main portion which supports the computer shall slide outward on full extension runners for access. The clear interior dimensions shall be: 9" wide x 21" high x 22" deep.

2.5 METAL FINISH

- A. General: Prepare, treat, and finish welded assemblies after assembling. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: After assembly, clean surfaces of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply laboratory casework manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

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1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8 M. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
2. Colors for Metal Laboratory Casework Finish: As selected by Architect from manufacturer's full range.

2.6 TABLETOP MATERIALS

- A. Refer to Section 12 35 53 "Metal Laboratory Casework"

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- C. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where indicated on Shop Drawings.
- B. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Shop prepare edges for field-made joints.
 1. Use concealed clamping devices for field-made joints in plastic-laminate countertops. Locate clamping devices within 6 inches of front and back edges and at intervals not

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exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.

C. Fastening:

1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
2. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches o.c.
3. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.

D. Provide required holes and cutouts for service fittings.

E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.

F. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 CLEANING AND PROTECTING

A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

B. Protect countertop surfaces during construction with 6-mil plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches o.c.

END OF SECTION 12 35 60