

SECTION 12 31 00
MANUFACTURED METAL CASEWORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies fixed and non fixed metal laboratory casework, laboratory countertops and related accessories including base cabinets, wall cabinets, counter supports non fixed laboratory tables and overhead service carriers.

1.2 RELATED WORK

- A. Blocking for casework: Section 06 10 00 ROUGH CARPENTRY.
- B. Resilient base at metal casework: Section 09 65 13 RESILIENT BASE AND ACCESSORIES.
- C. Section 11 53 53 BIOLOGICAL SAFETY CABINETS AND LAMINAR AIRFLOW WORK STATIONS
- D. Section 12 36 00 COUNTERTOPS
- E. Division 22 PLUMBING
- F. Division 26 ELECTRICAL

1.3 CASEWORK GENERAL DESIGN REQUIREMENTS

- A. Flush overlay construction: Surfaces of doors, drawers and panel faces shall overlay the cabinet ends, top or bottom rails. Horizontal and vertical case shell members (panels, top rails and bottoms) shall be concealed behind the drawer and door fronts. Reveals shall be a uniform 1/8" horizontally between drawer and door fronts and 5/16" vertically between adjacent steel drawer and door fronts.
- B. Frame styling: Front width of end panels and front height of top and bottom members 1-1/4".
- C. Self-supporting units: Completely welded shell assembly so that cases can be used interchangeably or as a single, standalone unit.
- D. Interior of case units: Easily cleanable with removable bottoms panned up. Base cabinets, 30" and wider, with double swinging doors shall provide full access to complete interior without center vertical post.
- E. 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.
- F. Case openings: Rabbeted joints sides and bottom of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.

1.4 QUALITY ASSURANCE

- A. Approval by VA COR of proposed manufacturer, or suppliers, will be based upon submission by Contractor certification that the manufacturer regularly produces casework and accessories of the types indicated for this project that have been tested for compliance with SEFA 8 for casework and SEFA 10 for the flexible table systems 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. Installer qualifications: Factory trained and certified by the casework manufacturer for the installation of casework indicated.
- D. 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.
- E. Power Manifolds must be UL labeled.
- F. Warranty: Provide one year warranty against defects in materials and workmanship.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, 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. 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, to be used in installation once VA COR has approved shop drawings.

1.6 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):
- A36/A36M-08.....Carbon Structural Steel
 - A167-99(R 2009).....Stainless and Heat-Resisting Chromium Steel Plate Sheet and Strip
 - A283/A283M-03(R 2007)...Low and Intermediate Tensile Strength Carbon Steel Plates
 - A568/A568M-09.....Steel, Sheet, Carbon and High-Strength, Low-Alloy Hot-Rolled and Cold-Rolled, General Requirements
 - A794/A794M-09.....Standard Specification for Commercial Steel (CS), Sheet, Carbon (0.16% Maximum to 0.25% Maximum) Cold Rolled
 - B456-03(R2009).....Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 - C1036-06.....Flat Glass
- C. American National Standard Institute:
- Z97.1-09.....Safety Glazing Material used In Buildings
- D. Builders Hardware Manufacturers Association (BHMA):
- A156.1-06.....Butts and Hinges
 - A156.9-10.....Cabinet Hardware
 - A156.5-10.....Auxiliary Locks and Associated Products
 - A156.11-10.....Cabinet Locks
 - A156.16-02.....Auxiliary Hardware
- E. American Welding Society (AWS):
- D1.1-10.....Structural Welding Code Steel
 - D1.3-08.....Structural Welding Code Sheet Steel
- F. National Association of Architectural Metal Manufacturers (NAAMM):
- AMP 500-505-06 Series...Metal Finishes Manual
- G. U.S. Department of Commerce, Product Standard (PS):
- PS 1-95.....Construction and Industrial Plywood
- H. Federal Specifications (Fed. Spec.):

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: CiF Lab Solutions 53 Courtland Avenue, Vaughan, ON, Canada L4K3T2
- B. Subject to compliance with requirements, provide product by one of the following:
 - CiF Lab Solutions (Northeast Interior Systems) 315-622-3121
 - Bedcolab Ltd (800)461-6414
 - Lab Crafters (631)471-7755

2.2 MATERIALS

- A. Sheet Steel:
 - 1. High quality, cold rolled mild steel meeting requirements of ASTM A366; gauges U.S. Standard.
 - 2. Minimum gauges:
 - a. 20 gauge: Solid door interior panels, door exterior panels, drawer fronts, back panels, drawer bodies, security panels and sloping tops.
 - b. 18 gauge: Ends, bottoms, bases, vertical posts, shelves, access panels, table legs and frames, leg rails and stretchers.
 - c. 16 gauge: Top front rails, top rear gussets, intermediate horizontal rails.
 - d. 14 gauge: Door and case hinge reinforcements and front corner reinforcements.
 - e. 11 gauge: Table leg corner brackets and gussets for leveling screws.
- B. Structural Steel: ASTM A366.
- C. Stainless Steel: ASTM A167, Type 302B.
- D. Fasteners:
 - 1. Exposed to view, chrome plated steel or stainless steel, or finished to match adjacent surface.
 - 2. Use round head or countersunk fasteners where exposed in cabinets.
 - 3. Expansion Bolts: Fed Spec. A-A-55615. Do not use lead or plastic shields.

4. Nuts: Fed Spec FF-N-836. Type III, Style 15 where exposed.
5. Sex Bolts: Capable of supporting twice the load.

2.3 MANUFACTURED PRODUCTS

- A. When two or more units are required, use products of one manufacturer.
- B. Manufacturer of equipment assemblies, which include components made by other, shall assume complete responsibility for the final assembled unit.
- C. The bases of design shall be CiFLab Solutions, Pinnacle Series Flexible Table - Manual with MD Leveling for the flexible tables and CiFLab Solutions, Metal Cabinet S-Line Series with flush overlay, metal doors.

2.4 CASEWORK FABRICATION

- A. General:
 1. Welding: Comply with AWS Standards.
 2. Reinforce with angles, channels, and gussets to support intended loads, notch tightly, fit and weld joints.
 3. Constructed of sheet steel, except where reinforcing required.
 4. Load rating: The load rating listed below is for static loads that are evenly distributed over the entire area of the table. The entire area encompasses loads applied to the work surface, weight of hanging cabinets and loads placed within the cabinets and loads placed on shelves above or below the work surface.

a) Load 1200 lbs.

- B. Minimum Steel Thickness:

0.89 mm (0.035 inch) (20 gage)	Drawer fronts, backs, bodies, closure plates or scribe and filler strips less than 75 mm (three inches) wide, sloping top, shelf reinforcement channel and shelves. Toe space or casework soffits and ceilings under sloping tops.
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Solid door interior panels, door exterior panels, drawer fronts, back panels, drawer bodies, security panels and sloping tops.

1.20 mm (0.047 inch) (18 gage)	Base pedestals, casework top sides, back, and bottom panels, closure scribe and filler strips 75 mm (three inches) or more. Reinforcement for drawers with locks. Tables legs, spreaders and stretchers, when fabricated of cold rolled tubing. Metal for desks; except legs and aprons. Door exterior and interior panels, flush or glazed. Cross rails of base units. Front bottom rails, back bottom rails; rails may be 1.49 mm (0.059 inch) (16 gage) thick. Uprights or posts. Top corner gussets. Ends, bottoms, bases, vertical posts, shelves, access panels, table legs and frames, leg rails and stretchers.
1.49 mm (0.059 inch) (16 gage)	Aprons, apron division, reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm (0.047 inch) (18 gage) thick. Top front rails, top rear gussets, intermediate horizontal rails.
1.88 mm (0.074 inch) (14 gage)	Drawer runners door tracks. Door and case hinge reinforcements and front corner reinforcements.
2.64 mm (0.104 inch) (12 gage)	Base unit bottom corner gussets and leg sockets.
3 mm (0.12 inch) (11 gage)	Reinforcement for hinge reinforcement inside doors and cabinets. Table leg corner brackets and gussets for leveling screws.

C. Casework Construction:

1. Welded assembly.
2. Fabricate with enclosed uprights or posts full height or width at front, include sides, backs, bottoms, soffits, ceilings under sloping tops, headers and rail, assembled to form an integral unit.
3. Front post fully formed. Shelf adjustment holes in front and rear posts shall be perfectly aligned for level setting.
4. Make bottom of walls units flush, double panel construction.
5. Make top and cross rails of "U" shaped channel.
6. Provide enclosed backs and bottoms in cabinets, including drawer units.

7. Provide finish panel on exposed cabinet backs.
 8. Do not use screws and bolts in construction or assembly of casework, except to secure hardware, applied door stops, accessories, removable panels and where casework is required to fasten end to end or back to back.
 9. Fabricate casework, except benches, and desks with finished end panels.
 10. Close flush exposed soffits of wall hung shelving, knee spaces in counters, and toe spaces at bases.
 11. In base units with sinks provide one piece, lowered backs.
 12. In base units with doors provide removable backs.
 13. Provide reinforcing for hardware.
 14. Size Dimensions:
 - a. Used dimensions shown or specified within tolerances specified.
 - b. Tolerance:
 - 1) Depth: 325 mm (13 inches) in lieu of 300 mm (12 inches), 450 mm (18 inches) in lieu of 400 mm (16 inches), except wall hung units above counter. 525 mm (21 inches) to 600 mm (24 inches) in lieu of 550 mm (22 inches).
 - 2) Width: Minus 25 mm (one inch).
 - 3) Height: 25 mm (one inch) plus or minus for wall hung cabinets and counter mounted cabinets, excluding sloping tops. 25 mm (one inch) plus for floor standing cabinets, excluding base and sloping tops. Full height cabinets shown back to back same height.
 - 4) Manufacturer's tolerance for the same length, depth or height: Not to exceed 1.58 mm (0.0625 inches).
- D. Base Pedestals:
1. Provide 3/8" diameter leveling screw with integral bottom flange of minimum 0.56 sq. in. area at each corner, accessible through removable bottom.
 2. Except where flush metal base is shown, provide toe space at front recessed 75 mm (3 inches).
- E. Doors:
1. Solid panel doors: 3/4" thick, double wall, telescoping box steel construction with interior pre-painted and sound deadened. Hollow metal type, flush and glazed doors not less than 16 mm (5/8 inch) thick.
 2. Provide sheet steel hinge reinforcement inside doors.

3. Doors removable without use of tools except where equipped with locks.

F. Drawers:

1. Drawer fronts: 3/4" thick, double wall construction, pre-painted prior to assembly and sound deadened.
2. Drawer bodies: Bottom and all sides formed into one piece with bottom and sides coved and formed top edges.
3. Drawer suspension: 100 lb. full extension drawer slides for full access and operation.
4. Equip with roller suspension guides.

G. Shelves:

1. Capable of supporting an evenly distributed minimum load of 122 kg/m² (twenty-five pounds per square foot) without visible distortion.
2. Form front and back edges down and back 3/4". Form ends down 3/4".
3. Reinforce shelves over 36" long with welded hat channel reinforcement the full width of shelf
4. Weld shelves to metal back and ends unless shown adjustable.
5. Provide means of positive locking shelf in position, and to permit adjustment without use of tools.

H. Undercounter Table and Bench Frames:

1. Using welded construction.
2. Open frame type with aprons and legs when required.
3. Aprons:
 - a. Channels shaped welded at corners, with leg sockets and reinforcing triangular corner gussets welded in corners.
 - b. Pierce sockets to receive leg bolts and notch gussets to receive legs.
 - c. Upper flange perforated or slotted to receive screws at 200 mm (8 inch) centers, and back channels when installed against wall. Size slots for 6 mm (1/4 inch) anchor bolts.
 - d. Pierce aprons to receive drawer formation, rail at top of drawer opening. Install channel shaped apron division welded at ends, 762 mm 30 inches apart to front and back aprons, or at each side of drawer.
 - e. Fabricate metal components from sheet steel.
 - 1) Use 1.5 mm (0.0598 inch) thick sheet for gussets and channel aprons.
 - 2) Use 1.2 mm (0.0478 inch) thick sheet for other items.

- f. At knee space, provide exposed metal sides and metal closure plate for soffit. Where shown at knee space, provide exposed metal back secured with continuous angle closures at both side.
- 4. Legs:
 - a. Cold rolled tubing or 1.5 mm (0.0598 inch) formed steel.
 - b. Leveling-anchoring device at floor.
 - c. Stud bolt at top for attachment to leg socket.
- 5. Leg Braces:
 - a. Tables and benches not anchored to walls.
 - b. Brace back against front legs near bottom with steel angle, channel or tubular braces.
 - c. Fasten braces together with steel straps.
- 6. Leg Shoes:
 - a. Fit laboratory casework legs at bottom with either stainless steel, aluminum, or chromium plated brass shoes, not less than 25 mm (one inch) in height.
 - b. Fit other legs with a movable molded vinyl shoe 100 mm (four inches) high and coved at bottom.
- J. Closures and Filler Strips at Pipe Spaces:
 - 1. Flat steel strips or plates.
 - 2. Openings less than 200 mm (8 inches) wide: 1.2 mm (0.047 inch) thick.
 - 3. Openings more than 200 mm (8 inches wide 0.9 mm (0.359 inches) wide.

2.5 FLEXIBLE CASEWORK

- A. Manual Table "H" section AFH-Pinnacle series or equal.
 - 1. Formed steel base section utilizing various thickness of steel including 18ga, 14ga, 11ga & 7ga.
 - 2. Flat steel parts are laser cut ensuring a high quality edge, component fit and finish.
 - 3. Joints are tight fitting and welded construction.
 - 4. All exterior and exposed surfaces are finished in a powder-coated finish.
 - 5. Top deck and feet assemblies are mechanically bolted to the "H" section.
 - 6. Inner telescoping leg sections formed from 14ga CRS and have a powder coated finish on the outside surfaces.
 - 7. Inner telescoping legs utilize plastic guide blocks at the top and bottom of the outer leg to guide and stabilize the movement.
 - 8. Height adjustment is accomplished using a hand-retractable plunger system. Total range of adjustment is 15.75".

B. Table Feet

1. Leveler type feet
 - a. Consist of a structural outer decorative shell with an inner "U" shaped support channel that are welded together.
 - b. Leveler attachment is done using a hex nut, which is welded to the inner "U" section. Drive-in type leveling glide inserts are not allowed.
2. Drop-Down type feet
 - a. Consist of a structural outer decorative shell, side drop foot panels and two inner "U" shaped support channels that are all welded together.
 - b. The drop style foot allows the use of casters while still maintaining the original nominal height range of the table as if using leveler glides.
 - c. Caster attachment is done using a hex nut, which is welded to the inner "U" section. Casters have a threaded stem for mounting to the foot. Drive-in type leveling glide inserts are not allowed.

C. Top Deck frame

1. Constructed of 1 ½"-14 gauge square steel tubing for table widths of 48" to 72". 84" and greater widths will use 1 ½"-11ga square tubing.
2. Corner braces and gussets are 11 gauge cold rolled steel.
3. All corners are welded along with braces and gussets to ensure rigidity and strength. Bolted corner joints and gussets are not acceptable. Exceptions are deck structures too large for shipment or travel into the building.

D. Casters

1. Leveling swivel type
 - a. Shall be a 4 1/32" nominal height with a 2 ½" diameter wheel.
 - b. Must have a minimum load rating of 500 lbs per caster.
 - c. Shall be ball bearing with 360 ° swivel.
 - d. Shall have a threaded type drop down stabilizer foot that allows leveling of the table and immobilizes the rolling action of the table.

E. Leveler Glides

1. Plastic base glide with metal cap and integral hex nut and metal threaded stem.

2. Thread type is $\frac{1}{2}$ -13 x 1 1/2" long.
3. Base diameter is 1 $\frac{3}{4}$ ".

F. Floor lag plates

1. Nominal 4" x 4" square plate with $\frac{1}{2}$ -13 x 1 $\frac{1}{2}$ " threaded stem to allow fit into the typical leveling glide threaded hole in the table foot.
2. Lag plate to have four 5/8" diameter mounting holes to allow table to be bolted to building floor.

G. Paint Finish

1. Powder coat finish using an epoxy powder.

H. Uprights and Shelving

1. Shelving units to be 24", 30", 36" and 48" wide.
2. Steel slotted uprights provide for 1" adjustment increments.
3. Finish to be epoxy powder coat.
4. Uprights to be mounted by through bolting to the work surface.
5. Uprights to be provided at 48" heights.
6. Provide reversible book end shelf brackets
7. Provide 3-tier post and rail front shelf retainer
8. Provide L-shaped rear retainer
9. Shelves to be 1" solid phenolic resin

I. Power Manifold

1. Wiremold® Surface aluminum raceway system shall be Single or Multi-Channel type as shown.
2. The raceway systems shall provide protection for power, low voltage, data and communication.
3. Raceway system shall consist of a single base and pre-cut snap on covers, each removable from the base allowing access to individual channels.
4. Multi-Channels shall provide the minimum following cross sectional areas:
 - a. ALA3800 Series Single Channel: 2 1/4:" X 3" (5.93 sq. in.)
 - b. Surface raceway shall be recognized by the National Electrical Code, Article 352-B, for Surface Nonmetallic Raceway.
 - c. Raceway shall be UL listed for electrical wiring up to 300 volts and comply with UL-5A.
 - d. All components shall be satin finished and clear anodized.

2.6 HARDWARE

- A. Factory installed.
- B. Exposed hardware, except as specified otherwise, nickel plated brass or anodized aluminum.
- C. Cabinet Hardware: ANSI BHMA A156.9.
 - 1. Door/Drawer Pulls: Aluminum wire pulls
 - a. One for drawers up to 575 mm (23 inches) wide.
 - b. Two for drawers over 575 mm (23 inches) wide.
 - c. Sliding door flush pull, each door: B02201.
 - 2. Cabinet Door Catch:
 - a. Install at bottom of wall cabinets, top of base cabinets and top and bottom of full height cabinet doors over 1200 mm (48 inches).
 - b. Omit on doors with locks.
 - 3. Drawer Slides:
 - a. Drawer suspension: 100 lb. full extension drawer slides for full access and operation.
 - 4. Butt Hinges:
 - a. Replace with," Hinges: 304 Stainless-steel, 5-knuckle hinges complying with BHMA A156.9, Grade 1, 2.75 inches high, 0.095 inch material gage, with antifriction bearings and hospital tips, non removable. Provide 2 for doors 48 inches high or less and 3 for doors more than 48 inches high.
 - b. Do not weld hinges to doors or cabinets.
 - 5. Shelf Supports:
 - a. Adjustable Shelf Supports for Metal Cabinets: Powder-coated steel shelf rests complying with BHMA A156.9, Type B04013.
 - 6. Auxiliary Hardware: ANSI A156.16.
 - 7. Door silencers: L03011 or L03031.
 - a. Install two rubber bumpers each door.
 - b. Silencers set near top and bottom of jamb.

2.7 METAL FINISHES

- A. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions and with a cumulative score not to exceed 35.
- B. Steel Cabinets including Closures and Filler Strips:
 - 1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pretreat with iron phosphate spray, water rinse, and

neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.

- a. Exterior and interior surfaces exposed to view: 1.5 mil average and 1.2 mil minimum.
 - b. Surfaces not exposed to view: 1.0 mil average
2. After fabrication of cabinet submerge in a degreasing bath, and thoroughly rinse to remove dirt and grease, and other foreign matter.
- C. Finish resistant to action of the following reagents when 10 drops (0.5 cm³) are applied to the surface and left open to the atmosphere for period of one hour.

Hydrochloric Acid 37 percent	Ethyl Alcohol
Phosphoric Acid 75 percent	Methylethyl Keytone
Sulfuric Acid 25 percent	Acetone
Glacial Acetic Acid	Ethyl Acetate
Sodium Hydroxide 10 percent	Ethyl Ether
Sodium Hydroxide (concentrated)	Carbon Tetrachloride
Ammonia Hydroxide (concentrated)	Xylene
Hydrogen Peroxide 5 percent	Phenol 85 Percent
Formaldehyde 37 percent	

- D. Aluminum: Chemically etched medium matte, clear anodic coating, Class II, Architectural, 0.4 mils thick.
- E. Stainless Steel: Mechanical finish No. 4 on sheet except No. 7 on tubing.

2.8 WING OVERHEAD SERVICE CARRIER

- A. SUSPENDED OVERHEAD SERVICE CARRIER (FULL WING) by same supplier as casework and including the following:
1. Unit shall be designed to carry all media services including water, vacuum, gasses, electrical, data and communications.
 2. Service Carrier to be designed in separate interchangeable 24", 36", 48", 60", and 72" sections.
 3. Each section shall have pre-punched plumbing fixture and electrical fixture mounting openings. Future use of unused openings shall not require field modifications. Openings shall incorporate integral covers that remain and cover holes when not in use or when fixtures are removed.

4. Internal strut supports are designed for securing supply lines (by others) with strut type clamps.
 5. Service Carrier to be formed steel structure that allows slight angled access to fixtures from either side of unit.
 6. Exterior and interior finish to be epoxy powder coated.
 7. Service Carrier to allow clear unobstructed access and use of furniture below.
 8. Service Carrier to incorporate integral ceiling supply umbilical and/or threaded rod supports for each service run.
 9. Above ceiling supports shall be tied to building structure to provide adequate support.
 10. 700mm Service Carrier shall allow for optional local exhaust where shown.
 11. 700mm Service Carrier shall allow for optional integral center light fixture for down lighting where shown.
 12. Service Carrier shall allow for optional integral up lighting fixtures where shown.
 13. Fixtures available for services include adjustable valves, no drip no leak quick disconnects, communication, data outlets, and electrical.
 14. Available in 28" nominal widths (700mm).
 15. Service carrier shall be installed in locations and heights as shown on plans.
 16. Utilities provide to the overhead service carrier shall be designated in the utilities individual spec section and 2.10 of this specification.
- B. DUST COVERS:
1. The "Wing" overhead service carrier shall include an optional dust cover.
 2. Dust covers are formed from mild steel and powder coated finish to be epoxy powder coated.
 3. Dust covers for a run consist of two end caps, two dust cover halves for each 6-foot length as a minimum. Adder sections and splice plates are to be used on runs over 6 feet in length.
 4. Dust covers shall be added to an existing installation as long as the services all fit within the profile of the covers.
 6. The dust cover components are assembled together with removable sheet metal screws.

2.9 OVERHEAD SERVICE CARRIER SUSPENSION:

- A. As provide by the overhead service carrier manufacture which forms a combinations of metal formed drops with closure panels and threaded rods.

2.10 WIRING AND PLUMBING OF THE OVERHEAD SERVICE CARRIERS:

- A. Mechanical and electrical services shall be factory installed per applicable national, state and local codes by qualified trades persons and brought to the job site for installation pre-wired and plumbed.
- B. Electrical
1. Our standard, when a standard is not specified at time of bid is:
 - a. Each circuit 115/120 volt AC- 20 amp standard on "Wing" and SKYCAP.
 - b. All materials are NEMA approved and UL rated.
 - c. Leviton #2310 or equivalent twist lock receptacles and Leviton 2311 or equivalent for cord cap are standard on Wing.
 - d. Leviton # BR20-G or equivalent duplex outlets are standard on the SKYCAP unless Wiremold Aluminum Raceways are selected.
 - e. Conduit and wiring specification is AFC-MCT12-3WGSTR
 - f. Electrical wiring will be 12-3 copper with 12-gauge ground wire.
 - g. Conduit is aluminum solid metal clad.
 - h. Junction boxes are Appelton #4-SPL-Dr or equivalent.
 - i. Switch boxes are Appelton 222 or equivalent.
 - j. Each electrical circuit is tested for continuity at the factory.

2.11 LABORATORY COUNTERTOPS & TABLE TOPS

- 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, with continuous drip groove on underside 1/2 inch from edge unless otherwise detailed on drawings.
- B. 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:
 - a. Durcon Company (The).
 - b. Epoxyn Products.

- c. Prime industries, inc.
- 2. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi.
 - b. Modulus of Elasticity: Not less than 2,000,000 psi.
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.01 percent.
 - e. Heat Distortion Point: Not less than 260 deg F.
- 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).
- C. Color:
 - A. As indicated in the drawings on the Finished Materials Schedule, sheet A-603
- D. Epoxy Countertops:
 - 1. Countertop Fabrication: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and with butt joints assembled with epoxy adhesive (in fixed casework only).
 - a. Countertop Configuration: Flat, 1 inch thick, with beveled edge and corners, and with drip groove at overhanging edges and sinks and applied backsplash.
 - 1) Provide Marine Edge at sinks as indicated.
 - b. Countertop Construction: Uniform throughout full thickness.
 - 2. Table-Top Fabrication:
 - a. Table-Top Configuration: Flat, 1 inch thick, with beveled edge and corners, and with drip groove at perimeter.
 - 3. Seal gap between back splash and wall with acrylic latex sealant.
 - 4. All exposed edges shall be smooth and polished.
 - 5. Joint between segments of tops and back splashes:
 - a. Smooth, even, and level with no raised edges.
 - b. Width: 1/8 inch maximum.
 - c. Seal watertight with modified epoxy resin cement.

6. Epoxy Resin countertops:

- a. Cut to size of cabinet or knee space below, where indicated on drawing. Where no indication is made, countertops lengths shall be at Contractor's option with termination points at base cabinet or knee space edges.
- b. Do not cut to be smaller than 24 inches wide.
- c. Fabricate with drip grooves on underside of exposed edges.
- d. Fabricate exposed edges of base sections of countertops with a 1/4 inch chamfer on front top edge, square bottom edge, and vertical corners; fabricate other countertop edges with square tops and bottoms.
- e. Bond back splash to surface of countertop to form square joint.
- f. Back splash

PART 3 - EXECUTION

3.1 COORDINATION

- A. Before installing casework, verify wall and floor surfaces covered by casework have been finished.
- B. Verify location and size of mechanical and electrical services as required.
- C. Verify reinforcement of walls and partitions for support and anchorage of casework.

3.2 FASTENINGS AND ANCHORAGE

- A. Do not anchor to wood ground strips.
- B. Provide hat shape metal spacers where fasteners span gaps or spaces.
- C. Use 6 mm (1/4 inch) diameter toggle or expansion bolts, or other appropriate size and type fastening device for securing casework to walls or floor. Use expansion bolts shields having holding power beyond tensile and shear strength of bolt and breaking strength of bolt head.
- D. Use 6 mm (1/4 inch) diameter hex bolts for securing cabinets together.
- E. Use 6 mm (1/4 inch) by minimum 38 mm (1-1/2 inch) length lag bolt anchorage to wood blocking for concealed fasteners.
- F. Use not less than No. 12 or 14 wood screws with not less than 38 mm (1-1/2 inch) penetration into wood blocking.
- G. Space fastening devices 300 mm (12 inches) on center with minimum of three fasteners in 900 or 1200 mm (three or four foot) unit width.
- H. Anchor floor mounted cabinets with a minimum of four bolts through corner gussets. Anchor bolts may be combined with or separate from leveling device.

- I. Secure cabinets in alignment with hex bolts or other internal fastener devices removable from interior of cabinets without special tools. Do not use fastener devices which require removal of tops for access.
- J. Where units abut end to end anchor together at top and bottom of sides at front and back. Where units are back to back anchor backs together at corners with hex bolts placed inconspicuously inside casework.
- K. Where type, size, or spacing of fastenings is not shown or specified, show on shop drawings proposed fastenings and method of installation.

3.3 CLOSURES AND FILLER PLATES

- A. Close openings larger than 6 mm (1/4 inch) wide between cabinets and adjacent walls with flat, steel closure strips, scribed to required contours, or machined formed steel fillers with returns, and secured with sheet metal screws to tubular or channel members of units, or bolts where exposed on inside.
- B. Where ceilings interfere with installation of sloping tops, omit sloping tops and provide flat steel filler plates.
 - 1. Secure filler plates to casework top members, unless shown otherwise.
 - 2. Secure filler plates more than 150 mm (six inches) in width top edge to a continuous 25 by 25 mm (one by one inch) 0.889 mm thick steel formed steel angle with screws.
 - 3. Anchor angle to ceiling with toggle bolts.
- C. Install closure strips at exposed ends of pipe space and offset opening into concealed space.
- D. Paint closure strips and fillers with same finishes as cabinets.
- E. Caulk and seal laboratory furniture as specified in Section 07 92 00,
JOINT SEALANTS.

3.4 CABINETS

- A. Install in available space; arranged for safe and convenient operation and maintenance.
- B. Align cabinets for flush joints except where shown otherwise.
- C. Install cabinets level with bottom of wall cabinets in alignment and tops of base cabinets aligned.
- D. Install corner cabinets with hinges on corner side with filler or spacers sufficient to allow opening of drawers.
- E. Plug Buttons:
 - 1. Install plug buttons in predrilled or prepunched perforations not used.

2. Use chromium plate plug buttons or buttons finish to match adjacent surfaces.

F. Cabinets 6D: Ground to nearest cold water pipe in accordance with NFPA, Underwriters Laboratories, Inc., or other nationally recognized laboratory approved ground specified system.

3.5 PROTECTION TO FIXTURES, MATERIALS, AND EQUIPMENT

A. Tightly cover and protect cabinets against dirt, water chemical or mechanical injury.

B. Thoroughly clean interior and exterior of cabinets, at completion of all work.

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