SECTION 123553.13
METAL LABORATORY CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Standard and custom metal cabinets and cabinet hardware.
B. Mobile cabinets.
C. Tables.
D. Wall shelving.
E. Fixed- and adjustable-height workbenches.
F. Service space framing.
G. Service enclosures.
H. Acid storage cabinets.
I. Solvent storage cabinets.
J. Vacuum pump cabinets.
K. Ceiling service panels.
L. Countertops.
M. Ledges.
N. Laboratory sinks.
O. Pegboards.
P. Laboratory emergency equipment plumbing fixtures.
Q. Service fittings and outlets.

1.02 RELATED REQUIREMENTS

A. Section 260533.23 - Surface Raceways for Electrical Systems: Surface raceway systems.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
B. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment; 2014.
C. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2025.
D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.
F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
G. ASTM D522/D522M - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings; 2017 (Reapproved 2021).
H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

I. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.

J. BHMA A156.9 - Cabinet Hardware; 2020.

K. ICC (IFC) - International Fire Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. NFPA 1 - Fire Code; 2024, with Errata.

M. NFPA 30 - Flammable and Combustible Liquids Code; 2024, with Errata (2025).

N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

O. SEFA 1 - Laboratory Fume Hoods; 2010.

P. SEFA 2 - Installations; 2010.

Q. SEFA 3 - Laboratory Work Surfaces; 2020.

R. SEFA 7 - Laboratory Fixtures; 2021.

S. SEFA 8M - Laboratory Grade Metal Casework; 2020.

T. SEFA 10 - Adaptable Laboratory Furniture Systems; 2013.

U. SEFA 11 - Liquid Chemical Storage Cabinets; 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of casework with related items.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements placement dimensions and tolerances, clearances required, and utility locations, if any. Include coordinated information for laboratory equipment specified in another section and/or furnished by Owner.

C. Test Reports: Independent laboratory reports showing compliance with chemical and physical resistance requirements for casework finish and countertops.

D. Maintenance Data: Manufacturer's recommendations for care and cleaning.

E. Finish touch-up kit for each type and color of materials provided.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

1.08 MOCK-UPS

A. Provide full size base cabinet complete with drawers, door, adjustable shelf and countertop.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Locate where directed.

D. Mock-up may remain as part of the work.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Casework manufacturer Warranty: Provide 5-year warranty against defects. Complete forms in Owner's name and register with manufacturer. Covered defects include, but are not limited to:
   1. Ruptured, cracked, or stained finish coating.
   2. Discoloration, or lack of finish integrity.
   3. Cracking or peeling of finish.
   4. Weld or any other structural failure.
   5. Failure of hardware.

C. Counter manufacturer Warranty: Provide 10 warranty against defects. Complete forms in Owner's name and register with manufacturer. Covered defects include, but are not limited to:
   1. The warranty to include the specified physical and chemical properties. The manufacturers authorized fabricator, product installer and panel manufacturer must sign the warranty documents and submit a copy to the contractor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Laboratory Casework:
   1. Bicasa USA www.bicasa.it/en/. Basis of Design
   2. Waldner NA www.wnalabs,com
   3. Kewaunee Scientific Corp;[____]: www.kewaunee.com/#sle.

B. Countertops:
   1. Phenolic Resin:
      a. Trespa Top Lab plus
      b. Fundermax CTC, Basis of Design
   2. Stainless Steel
      a. Integral sinks, backspash, or trough.
      b. Marine grade playwood underlayment.
   3. High Temperature counter
      a. Ceramic/Stoneware
         1) Basis of Design: Stoneware, Waldner Laboratory Furniture, or accepted alternate by accepted casework vendor.

C. Sinks and Cup Sinks:
   1. Durcon (Epoxy resin, Polyolefin); ____: www.durcon.com/#sle.
   2. Scientific Plastics, Inc. (Polyolefin); ____: www.scientificplastics.com/#sle.
   3. Substitutions: See Section 016000 - Product Requirements.

D. Water and Gas Service Fittings:
   1. Broen-Lab A/S; ____: www.broen-lab.com/#sle.
   2. Chicago Faucets, a Geberit company; ____: www.chicagofaucets.com/#sle.
   3. WaterSaver Faucet Co; Basis of Design: www.wsflab.com/#sle.

2.02 METAL LABORATORY CASEWORK

A. Casework: Die-formed metal sheet; each unit self-contained and not dependent on adjacent units or building structure for rigidity; factory-fabricated, factory-assembled, and factory-finished.
   1. Basis of Design: Bicasa Metal Casework, Arctic White
      a. Casework hieghts as noted on the drawings
   2. Style: Flush overlay - square edge.
   3. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions.
      a. Base Cabinets: 22 inch (559 mm).
      b. Tall Cabinets: 22 inch (559 mm).
      c. Upper Cabinets: 13 inch (330 mm).
   4. Steel Sheet Metal:
      a. Gables, Front and Back Panels, Gusset Plates, Aprons, and Rails: 18 gauge, 0.0478 inch (1.21 mm) minimum thickness.
      b. Drawers, Cabinet Floors, Shelves, Filler Panels and Drawer Dividers: 20 gauge, 0.0359 inch (0.91 mm) minimum thickness.
      c. Backing Sheet to Door and Door Fronts: 22 gauge, 0.0299 inch (0.76 mm) minimum thickness.
   5. Structural Performance: In addition to the requirements of SEFA 3, SEFA 7 and SEFA 8M, provide components that safely support the following minimum loads, without deformation or damage:
      a. Base Units: 500 pounds per linear foot (744 kg/linear m) across the cabinet ends.
      b. Suspended Units: 300 pounds (136 kg), minimum, static load.
      c. Tables: 300 pounds (136 kg) on four legs.
      d. Drawers: 125 pounds (57 kg).
      e. Hanging Upper Cases: 300 pounds (136 kg).
      f. Shelves: 100 pounds (45 kg).
   6. Corners and Joints: Without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
   7. Edges and Seams: Smooth. Form counter tops, shelves, and drain boards from continuous sheets.
   8. Shelf Edges: Turned down 3/4 inch (19 mm) on each side and returned 3/4 inch (19 mm) front and back.
   9. Ends: Close open ends with matching construction.
   10. Welding: Electric spot welded; joints ground smooth and flush.
   11. Drawers and Doors: Fabricate drawer and door fronts of sandwiched sheets of sheet steel welded together and reinforced for hardware.
      a. Fill with sound-deadening core.
   12. Glazing: Type and thickness standard with manufacturer.
      a. Framed Doors: Tempered glass, with gaskets and removable stops; minimize rattling and vibration.
   13. Fittings and Fixture Locations: Cut and drill countertops, backs, and other casework components for service outlets and fixtures.
   14. Access Panels: Where indicated, for maintenance of utility service fixtures and fittings and mechanical and electrical components.
   15. Removable back panels on all base cabinets. Partial height back panels at sink cabinets.
   16. Filler Panels: Flanged on both sides, of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
   17. Scribe Panels: Similar to filler panels, except flanges on one side and flat on the other, of matching construction and finish.

18. Stainless Steel Finish: No.4, brushed finish.
19. Separation: Use bituminous paint or non-conductive tape to coat metal surfaces in contact with cementitious materials, and to separate dissimilar metals.

B. Mobile Cabinets: Same construction as fixed base cabinets, with modifications.
   1. Toe kick space eliminated.
      a. Cabinet underside reinforced with 14 gauge, 0.0747 inch (1.9 mm) minimum steel channels to provide caster mounting points.
      b. Four casters, each with a load rating of 165 pounds (74.8 kg).
   2. Provide 1/2" thick phenolic top, mobile cabinets must fit under cabinets where indicated.
   3. For cabinets with drawers, include a counterweight to prevent the cabinet from tipping when one drawer is opened.
      a. Drawers rated at 50 pounds (22.7 kg), minimum.

C. Acid Storage Cabinets: Construction identical to other cabinets, with following exceptions:
   1. Completely lined with corrosion-resistant liner material; stainless steel fasteners for all connections and hardware inside cabinet.
   2. Shelves: Perforated or vented, rigid polypropylene.
   3. Bottom Pan: Liquid tight, polypropylene liner covering entire bottom of acid storage cabinet.
   4. Vents: Comply with SEFA 1.
      a. Locate acid storage cabinet vents in accordance with manufacturer's instructions.
      b. Vent each acid storage cabinet separately.
      c. When acid storage cabinets are installed below fume hoods, provide louvered cabinet doors.
      d. Seal penetrations with chemical resistant sealant.

D. Solvent (Flammable and Combustible Liquids) Storage Cabinets: Construction identical to other cabinets, with following exceptions:
   1. Construct to NFPA 30 and applicable OSHA requirements.
   2. Fire Resistance: Maximum internal temperature of 325 degrees F (163 degrees C) at the center, and 1 inch (25.4 mm) from top of the cabinet when cabinet is subjected to a ten minute fire test that simulates fire exposure of a standard time-temperature curve specified in ASTM E119.
   3. Steel sheet, 18 gauge, 0.0478 inch (1.21 mm) minimum thickness, double panel construction with 1-1/2 inch (38 mm) space between panels and electrical grounding connection.
   4. Shelves: Full depth, adjustable sloped metal shelf.
   5. Bottom Pan: 2 inches (50.8 mm) deep liquid-tight pan covering entire bottom of cabinet.
   6. Cabinet Hardware: UL-listed.
      a. Hinges: Full-length stainless steel continuous (piano) hinges.
      b. Self-closing Doors: Comply with requirements of NFPA 1 and ICC (IFC). Minimum 90 degree opening. Three-point latch arrangement, door(s) shutting and latching automatically when hold-open device's fusible link melts at 165 degrees F (74 degrees C) under fire conditions outside the cabinet. At pair of doors, synchronize latching so that both doors always fully close.
      c. Door Handles: Manufacturer's standard, with slip-resistant grip.
      d. Grounding screw-lug.
   7. Signage: Provide manufacturer's standard signage reading "FLAMMABLE - KEEP FIRE AWAY" or similar message in bright red color.

E. Waste Disposal Cabinets.

1. No cabinet bottom but with integral toe space, removable back panels, and precut 2-1/2 inch (63.5 mm) hole for drainage from fume hood above .
2. Waste Platform: Separate from cabinet, capable of supporting 300 pounds (136 kg), two of four casters to be lockable, swivel-type; 2 inch (50.8 mm) lip and liquid tight pan covering entire bottom of cabinet.

F. Vacuum Pump Cabinets: Construction identical to other cabinets, with following exceptions:
1. No cabinet bottom but with integral toe space, removable back panels, and precut 2-1/2 inch (63.5 mm) vent hole for separate vent assembly.
2. Insulation: Manufacturer's standard acoustical insulation on interior of door panels, interior side of back and panels as well as underside of top panel.
3. Motor Platform: Separate from cabinet, capable of supporting 300 pounds (136 kg), two of four casters to be lockable, swivel-type; 2 inch (50.8 mm) lip and liquid tight pan covering entire bottom of cabinet.
4. Pump On/Off Switch: Integral, 120V, 20A, with pilot light indicating availability of power and mode of vacuum pump operation.
   a. Conduit Stub: 20 foot (6 m), 1/2 inch (13 mm) flexible metal conduit connected to switch, for connection to building power.
5. Convenience Outlet: Integral electrical duplex outlet located in rear of cabinet, accessible from inside cabinet and pre-wired to pump on/off switch.

G. Tables: Include adjustable height units.
1. Adjustable Height Table Construction: Manufacturer's standard, with countertop worksurfaces, unless noted otherwise.
   a. Cantilevered Base Frame: Each base equipped with a pair of glides or leveling swivel casters as noted.
   b. Worksurface Support Frame: Telescoping from base frame.
   c. Worksurface: Phenolic Resin.
      1) Lift Capacity: 1,000 lb (454 kg), evenly distributed on worksurface.
      2) Adjustability:
         (a) Total Range: 14 inches (356 mm).
         (b) Manual Operation: Threaded fastener pins inserted into holes on 1 inch centers (on 25.4 mm centers).
      3) Finish, Surface Color, and Texture: As selected by Architect from manufacturer's standard line.
2. Accessory Components: Manufacturer's standard.
   a. Storage and Display Components: Sizes and configurations indicated on drawings.
      1) Storage cabinets.
      2) Cabinet Hardware: Manufacturer's standard types as required for drawers, doors, shelves, levelers, and similar items.
   b. Computer Support Components: Sizes and configurations indicated on drawings.
      1) Tower dolly.
      2) Computer monitor arm.
3. Primary Materials: Manufacturer's standard for each component.
   a. Tubing: Hot-rolled steel, ASTM A513/A513M.
   b. Sheet Metal: Cold-rolled steel, ASTM A1008/A1008M.
   c. Metal Finish Color: Arctic white.

H. Wall Shelving: At locations indicated.

1. Adjustable Shelf Supports: Standard back-mounted system using single-slotted surface mounted stainless steel shelf standards, in lengths indicated, with coordinated cantilevered shelf brackets, No.4 finish, designed for nominal 1 inch (25 mm) spacing adjustments.
2. Shelves: 3/4 inch thick (19 mm thick) phenolic resin shelves in lengths indicated.
   a. Depth: 12 inches (305 mm).

I. Apron Assemblies: Construction similar to other cabinets, fabricated from metal channel-shaped skirting panels.
   1. Assemblies consisting of front and back panels, with drawer suspension framing mechanically fastened to support channels. Weld support channels to skirting panels to form a riding one-piece frame.

J. Vertical Service Drop Enclosures: Where indicated on drawings, for service drops to metal casework.
   1. Frames: Unless otherwise standard with the manufacturer, channel strut frames, with members at all corners, bottom, mid-height, and top of enclosure. Designed for anchorages at the bottom to countertop, and at top to miscellaneous metal support framing.
   2. Enclosures: Consisting of fixed and removable (access) panels, in configuration standard with the manufacturer.
      a. Extent: Up to underside of ceiling.
      b. Rear Panel: Fixed panel, constructed like other casework closure panels.
      c. Side Panels: Fixed panels, constructed like other casework closure panels.
      d. Front Panels:
         1) Fixed Panel: Metal panel, constructed like other casework closure panels.
         2) Removable (Access) Panel: Metal panel, constructed like other casework closure panels.
      e. Attachment: Use corrosion-resistant metal mounting hardware and fasteners.
         1) Removable Panels: Mount with z-clips, welded-on pins and keyhole slots, or similar non-permanent means.

K. Ceiling Service Panels: Designed to integrate into acoustical panel suspension grids for delivering multiple plumbing, electrical and data services.
   1. Fabricated to fit in standard 24 inches by 24 inches (600 mm by 600 mm) ceiling grids.
   2. Enclosure Material: 18 gauge sheet steel with chemical-resistant finish specified herein.
   3. Required Fitting Types: Quick-connect fittings and hoses.
   4. Service Panel Types: Pre-punched panels accepting groups of services.
      a. Two-Station, 24 inches by 24 inches (600 mm by 600 mm) panel: Two (2) groups of six (6) service cutouts; Four (4) duplex receptacles cutouts; Two (2) data outlet cutouts.
   5. Quick-Connect Fittings: Male and female types, suitable for service connected, 3/8 inch NPS (10 mm DN).
      a. Provide in up to eight different sizes (keys) to prevent connecting to wrong service.
   6. Accessories:
      a. Service Hoses.
         1) Reinforced PVC Hoses: Provide for non-burning gases, 3/8 inch NPS (10 mm DN) female inlet and 3/8 inch NPS (10 mm DN) male outlet. 36 inch (914 mm) length.
      b. Power Cords.
         1) Dual-circuit, 4-wire, 20 AMP/120 VAC, 36 inches (914 mm) long, with Twist-Lock plugs.

2.03 FIXED AND ADJUSTABLE WORKBENCHES

A. Basis of Design: Bicasa H-Flex Bench, and K-Flex Systems

B. Type: Adjustable-height unit.

C. Lift Capacity: 750 lb (340 kg), evenly distributed on worksurface.

D. Primary Components: Manufacturer's standard; consisting of cantilevered base frame, worksurface support frame, and worksurface.
   1. Cantilevered Base Frame: Each base equipped with a pair of glides.
   2. Worksurface Support Frame: Telescoping from base frame.
   3. Worksurface: As indicated on drawings: Phenolic Resin or Wood backed stainless steel..
      a. Adjustability:
         1) Total Range: 15 inches (381 mm).
         2) Operation: Manual.
            (a) Manual Operation: Threaded fastener pins inserted into holes on 1 inch centers (on 25.4 mm centers).
      b. Finish, Surface Color, and Texture: As selected by Architect from manufacturer's standard line.

E. Accessory Components: Manufacturer's standard.
   1. Back Frame: Upright frame for mounting accessory components.
      a. Load Capacity: 250 lb (114 kg), evenly distributed.
      b. Mounting: Bolted to back of worksurface support frame.
      c. Divider Uprights: Flexible locations for subdividing the back frame into smaller sections.
      d. Electric Power Strip: Single receptacles at manufacturer's standard spacing with total current rating of 20 Amp.
   2. Storage and Display Components: Sizes and configurations indicated on drawings.
      a. Shelves.
      b. Storage cabinets.
      c. Cabinet Hardware: Manufacturer's standard types as required for drawers, doors, shelves, levelers, and similar items.

F. Primary Materials: Manufacturer's standard for each component.
   1. Tubing: Hot-rolled steel, ASTM A513/A513M.
   2. Sheet Metal: Cold-rolled steel, ASTM A1008/A1008M.

G. Metal Finish Color: Arctic White.

2.04 CABINET HARDWARE

A. Manufacturer's standard styles, and as indicated below.

B. Comply with BHMA A156.9 requirements.

C. Finish of exposed stainless steel components: No.4 finish.

D. Shelves in Cabinets:

E. Wall-Mounted Shelving:

F. Swinging Doors:
   1. Hinges: Offset pin, number as required by referenced standards for width, height, and weight of door.
      a. Butt Hinges for Inset Doors: five-knuckle, projecting barrel, minimum 2-1/2 inches long (five-knuckle, projecting barrel, minimum 64 mm long). Stainless steel with No.4 finish.

2. Catches: Magnetic.
3. Pulls: Chrome-plated brass wire pulls, 4 inches (102 mm) wide.

G. Drawers:
1. Pulls: Brass wire pulls, 4 inches wide (102 mm wide).
2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.05 COUNTERTOPS

A. Countertops:
1. Types: More than one type is required, as specified below. See drawings for location of each type of countertop.
2. Stainless Steel Countertops: , Type 304, stainless steel sheet; 16 gauge, 0.0625 inch (1.59 mm) nominal sheet thickness.
a. Finish: 4B satin brushed finish.
b. Exposed Edge Shape: Bullnose with return; 5/8 inch (16 mm) radius, return to face of case; reinforced with hardwood or steel.
c. Back and End Splashes: Same material; welded 1/4 inch (6 mm) radius coved joint to countertop; square top edge with 1 inch (25 mm) wide top surface and minimum 1/2 inch (12 mm) turndown.
3. Phenolic Resin Countertops:
a. Phenolic Resin Countertops: duromer high pressure, phenolic, compact laminate (Compact HPL), manufactured under high pressure at high temperature, in accordance with EN 438-4, type CGS. Layers of recycled kraft paper impregnated with phenolic resin with, double-cured polyurethane acrylic coating.
b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1) Fundermax Max Resistance ^{2} Color-Through Core
2) Trespa Top Lab Plus
3) Chem Tops Lab Grade SPC
c. Counter;
1) Flat Surface Thickness: 1 inch (25 mm), nominal.
2) Surface Finish: Smooth, non-glare.
3) Color: Gray.
4) Exposed Edge Shape: 1/8 inch (3 mm) bevel chamfer.
5) Back and End Splashes: Same material, same thickness; separate for field attachment.
d. Physical Properties
1) Density DIN 52350 / ISO 1183: $\geq$ 1,35g/cm^3 / $\geq$ 84lbs/ft^3
2) Modulus of elasticity EN ISO 178: $\geq$ 9000MPa / $\geq$ 1,305,340 psi
3) Modulus of elasticity EN ISO 178: $\geq$ 9000MPa / $\geq$ 1,305,340 psi
4) Tensile Strength EN ISO 527-2: $\geq$ 60 MPa / $\geq$ 8,702 psi
5) Resistance to Scratching EN 438-2 point 25: 4-6 N (6N = 1.35lbf)
6) Resistance to Impact EN 438-2 point 21: $\geq$8mm / $\geq$ 1/3”
7) Resistance to stress Abrasion EN 438-2 point 10: $\geq$ 450 U (rotations)
8) Dimensional stability measured at elevated temperatures with moisture change EN 438-2, point 17: $\leq$ 0.10% length : $\leq$ 0.21% width (CGS)
9) Resistance to boiling water EN 438-2, point 12: 0.5% (CGS/CGF) 1.5 (BCS)
10) Co-efficiency of thermal expansion DIN 52328: 20 x 10^{-6}
11) Resistance to dry heat EN 438-2, point 16: 4

12) Resistance to staining EN 438-2, point 26 (group 1-2): 5 no visible changes, no blisters or cracks
13) Light fastness EN 438-2 point 27: 4 or 5
14) Non porous and non-microporous surface and edges
15) Both sides decorative and chemical resistant
16) Double hardened acrylic surface finish
    (a) Min thickness of the acrylic finish: ≥ 0,1mm / 0.004”
17) Fire Resistive Properties:
    (a) Flame Spread Index: 25
    (b) Smoke Developed Index: 130

e. Chemical Resistance
1) Evaluation of chemical resistance based on SEFA 3-2010 Laboratory Work Surfaces standard list of 49 chemicals / concentrations, their required methods of testing (24-hour surface test) and exceed the acceptable results as a means of establishing an acceptable level of performance for all exposed and semi-exposed surfaces.
2) The chemical resistance performance should be as follows:
    (a) Rating Scale:
        (1) *Level 0 - No detectable change.*
        (2) *Level 1 - Slight change in color or gloss.*
        (3) *Level 2 - Slight surface etching or severe staining.*
        (4) *Level 3 - Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.*
    (b)

CHEMICAL/REAGENT	TEST METHOD	RATING
ACETATE, AMYL	A	0
ACETATE, ETHYL	A	0
ACETIC ACID - 98%	B	0
ACETONE	A	0
ALCOHOL, ETHYL	A	0
ALCOHOL, METHYL	A	0
ALOCHOL, BUTYL	A	0
AMMONIUM HYDROXIDE, 28%	B	0
BENZENE	A	0
CARBON TETRACHLORIDE	A	0
CHLOROFORM	A	1
CHROMIC ACID - 60%	B	0
CRESOL	A	1
DICHLORACETIC ACID	A	2
DICHROMATE ACID 5%	B	1
DIMETHYLFORMAMIDE	A	0
DIOXANE	A	0
ETHYL ETHER	A	0
FORMALDEHYDE, 37%	A	0

FORMIC ACID - 90%	B	1
FURFURAL	A	1
GASOLINE	A	0
HYDROCHLORIC ACID 37%	B	0
HYDROFLUORIC ACID, 48%	B	1
HYDROGEN PEROXIDE, 30%	B	2
IODINE, TINCTURE OF	B	1
METHYL ETHYL KETONE	A	0
METHYLENE CHLORIDE	A	0
MONOCHLOROBENZENE	A	0
NAPTHALENE	A	0
NITRIC ACID 20%	B	0
NITRIC ACID 30%	B	0
NITRIC ACID 70%	B	0
PHENOL, 90% (WT)	A	1
PHOSPHORIC ACID 85%	B	0
SILVER NITRATE, SATURATED	B	0
SODIUM HYDROXIDE FLAKE	B	0
SODIUM HYDROXIDE, 10% (WT)	B	0
SODIUM HYDROXIDE, 20% (WT)	B	0
SODIUM HYDROXIDE, 40% (WT)	B	0
SODIUM SULFIDE SATURATED	B	0
SULFURIC ACID, 33%	B	0
SULFURIC ACID, 77%	B	0
SULFURIC ACID, 77% & NITRIC ACID, 70% EQUAL PARTS	B	2
SULFURIC ACID, 96%	B	1
TOLUENE	A	0
TRICHOLOROETHYLENE	A	0
XYLENE	A	0
ZINC CHLORIDE, SATURATED	B	0

f. Phenolic resin tops shall be designed to provide the optimum physical and chemical resistance properties required of a heavy-duty laboratory table top. Tops and curbs shall be a uniform mixture throughout their full thickness, and shall not depend upon a surface coating that is readily removed by chemical and/or physical abuse. Tops and curbs shall be non-glaring Grey in color. (Color shall be approved by the Owner.)
   1) Seams and Joints: Tight fitting butt joints adhered with reactive adhesive/resin adhesive. Countertop shall be installed square level and flat, sealing seams shall not occur until counters are set square, level and flat.
   2) Table tops shall be 1" thick, with drip grooves provided on the underside at all exposed edges.
   3) Sinks: Provide epoxy undermount sinks per section below.
      (a) Under Mount – routed to form smooth edged openings with the top edge radius. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radius not less than 1/8”. All undermount sinks shall be supported by brackets blind fixed to the underside of the work surface and/or cabinet.

4. Heat/Chemical Resistant Counter: Stonehard, by Waldner, or approved substitution by accepted casework vendor.
   a. Heat Tolerance Requirements: 200 C
   b. Chemical Resistance: Able to resist use of HF, Li+, HNO3, H2SO4 and H2O2 without damage or staining.

2.06 LEDGES

A. Subsidiary tops, at same or different level than main countertops, intended as mounting surfaces for lab services fittings.

B. Material: Matching countertops.

2.07 SINKS

A. Laboratory sinks.
   1. General: Manufacturer's adjustable support system for undermount sink installation.
   2. Sink types and sizes are indicated on drawings.
   3. Sink Type: SK-01 : Single-bowl.
      a. Basis of Design: Model U56C manufactured by Durcon.
      b. Basis of Design: Model D15C manufactured by Durcon.
      c. Material: Epoxy.
      d. Mounting: Undermount.
      e. Outlet: 1-1/2 inch NPS (40 mm DN) outlet with tailpiece.
   4. Sink Type: SK-01A : Single-bowl.
      a. Material: Stainless Steel.
      b. Mounting: Intergral
      c. Outlet: 1-1/2 inch NPS (40 mm DN) outlet with tailpiece.
         1) Placement: Center.
      d. Placement: Center.
   5. Sink Type: SK-02 : Single-bowl.
      a. Material: Polyolefin.
      b. Mounting: Drop-in. In fume hood
      c. Outlet: 1-1/2 inch NPS (40 mm DN) outlet with tailpiece.
         1) Placement: Center.
   6. Cup Sink Type: CS-01: Polyolefin, with waste fitting.
      a. Shape: Oval.

b. Size: 3 inches by 9 inches (75 by 228 mm).

2.08 PEGBOARDS

A. Epoxy pegboards with pre-drilled or punched holes in a staggered pattern, designed to accept removable white polypropylene pegs. With each pegboard include a stainless steel drip-trough with drain outlet and matching diameter 36 inch (914 mm) long PVC drain hose.
   1. Size: 24 inches wide by 30 inches high (610 mm wide by 762 mm high).
   2. Accessories: Screen insert.

2.09 LABORATORY EMERGENCY EQUIPMENT PLUMBING FIXTURES

A. General: Provide emergency equipment products complying with requirements of ANSI Z358.1.

B. Eye/Face Wash Units: Deck-mounted units at sinks.
   1. Construction: Polished chrome-plated brass.
   2. Twin eyewash heads with pop-off dust covers, internal flow control, and filter.
   3. Type _____: 90-Degree horizontal-swivel, designed for mounting at either side of sink, with flag-handle activation.
      a. Plug-type valve designed to open orifice and activate water flow only when unit is swung down into operational position.
   4. Sign: Manufacturer's standard ANSI-compliant identification sign.
   5. Manufacturers:

C. Eyewash/Safety Shower Combination Units: Recessed into wall construction.
   1. Cover/Eyewash Drain Pan: Combination fixture, with projecting activation handle requiring grasping and pulling down into operating position for activation.
      a. Plug-type valve designed to open orifice and activate water flow only when unit is swung down into operational position
      b. Twin eyewash heads mounted on supply arms, with internal flow control, and filter.
   2. Shower Head: 10 inch (254 mm) diameter stainless steel, with 20 gallons per minute (4.15 L/s) flow control.
      a. Mounting: Below finished ceiling. Include vertical supply pipe and ceiling escutcheon.
      b. Offset Dimension from Wall to Centerline of Head: 36 inches, barrier-free (915 mm, barrier-free).
   3. Cabinet: Designed for recess into 3-5/8 inch (92 mm) minimum depth metal-framed wall construction.
      a. Mounting: Mount at height complying with ADA Standards.
   4. Activation Handle: Recessed into cabinet, projecting 1-7/8 inches (48 mm) maximum beyond face of wall, and requiring pushing down for activation.
      a. Grip: Manufacturer's standard vinyl grip.
   5. Water Supply: 1 inch NPS FPT (25 mm DN); 35 psi (241 kPa), minimum pressure.
   6. Drain Outlet: 2 inch NPS FPT (50 mm DN).
   7. Manufacturers:
      a. Watersaver.
      b. Guardian.

2.10 SERVICE FITTINGS

A. General: Comply with requirements of SEFA 7.

B. Gas Service Fittings and Fixtures.
   1. Laboratory Gas Fitting Type: CA-01:
      a. Basis of Design: Model L4880F-225WSA manufactured by Watersaver.

b. Valve: Forged or cast brass body, 90 degree inlet - outlet configuration, with polished chrome with clear epoxy coating finish.
c. Control: Needle valve.
d. Mounting: Panel (vertical surface).
e. Outlet: Manufacturer's standard, with removable seven-serration hose end.
1) Number: One.

2. Laboratory Gas Fitting Type: CA-02:
a. Basis of Design: Model L4880F-132AWSA manufactured by Watersaver.
b. Valve: Forged or cast brass body, 90 degree inlet - outlet configuration, with polished chrome with clear epoxy coating finish.
c. Control: Needle valve.
d. Mounting: Deck (horizontal surface) turret base.
e. Outlet: Manufacturer's standard, with removable seven-serration hose end.
f. Handle: Manufacturer's standard four-arm handle with color-coded index disc.

3. Vacuum Fitting Type: VAC-01:
a. Basis of Design: Model L4880F-225WSA manufactured by Watersaver.
b. Valve: Forged or cast brass body, 180 degree inlet - outlet configuration, with polished chrome with clear epoxy coating finish.
c. Control: Needle valve.
d. Mounting: Panel (vertical surface).
e. Inlet: 3/8 inch NPS (10 mm DN) NPT.
f. Outlet: Manufacturer's standard, with removable seven-serration hose end.
1) Number: One.
g. Handle: Manufacturer's standard four-arm handle with color-coded index disc.

4. Vacuum Fitting Type: VAC-02:
a. Basis of Design: Model L4880F-132AWSA manufactured by Watersaver.
b. Valve: Forged or cast brass body, 180 degree inlet - outlet configuration, with polished chrome with clear epoxy coating finish.
c. Control: Needle valve.
d. Mounting: Deck (horizontal surface) turret base.
e. Inlet: 3/8 inch NPS (10 mm DN) NPT.
f. Outlet: Manufacturer's standard, with removable seven-serration hose end.
1) Number: Two.
g. Vacuum Fitting Type: V, CA, N at fume hoods:
1) Basis of Design: Model L2885N/L022WSA manufactured by Watersaver.
2) Valve: Forged or cast brass body, 180 degree inlet - outlet configuration, with polished chrome with clear epoxy coating finish.
3) Control: Needle valve.
4) Mounting: Remote fume hood mounting.
5) Inlet: 3/8 inch NPS (10 mm DN) NPT.
6) Outlet: Manufacturer's standard, with removable ten-serration hose end.
7) Handle: Manufacturer's standard color-coded molded nylon hooded handle with color-coded index disc.

C. Water Service Fittings and Fixtures.
1. Water Fitting Mixing faucetType: F-01:
a. Basis of Design: Model L2224VB manufactured by Watersaver.
b. Valve: Forged or cast brass body, 180 degree inlet - outlet configuration, with polished chrome finish.
c. Mounting: Deck (Horizontal surface) turret base, with escutcheon.

d. Inlet: 3/8 inch NPS (10 mm DN) NPT.
e. Outlet: Manufacturer's standard, with anti-splash serrated hose end.
1) Number: One.
f. Handle: Manufacturer's standard wrist-blade handle with color-coded index disc.
2. Water, Single Faucet Type: F-02:
a. Basis of Design: Model L084 WSA manufactured by Watersaver.
b. Valve: Forged or cast brass body, 180 degree inlet - outlet configuration, with color epoxy coating finish.
c. Mounting: Deck (horizontal surface) turret base.
d. Inlet: 3/8 inch NPS (10 mm DN) NPT.
e. Provide vacuum breaker.
f. Gooseneck: Swing gooseneck, with 6 inch (153 mm) spread, anti-splash serrated hose end.
g. Handle: Manufacturer's standard remote fume hood fitting handle with color-coded index disc.
3. Water, valve Type: W-1:
a. Basis of Design: Model L4301-121WSA manufactured by Watersaver.
b. Valve: Forged brass body with polished chrome finish.
c. Full port ball valve construction with quarter-turn open / close, chrome plated brass ball and molded PTFE seals
d. Mounting: Deck (horizontal surface) turret base.
e. Inlet: 1/2 inch (_____ mm) IPS mounting shank (assembled), locknut and washer. 1/2″ NPT male inlet.
f. Handle: Forged brass lever handle with color-coded index disc.

D. Electrical Fittings and Fixtures:
1. Electrical Fittings, General: Types indicated, for mounting on laboratory casework, including, as appropriate, grounding screws, and mounting accessories and fasteners.
2. See Section 260533.23 for surface raceway systems.
3. Pedestal Boxes: Cast aluminum.
a. Finish: Epoxy powder coating, wrinkle black.
4. Electrical Power Fitting Type: See electrical drawings and specification:
a. General: 3-wire polarized receptacles meeting requirements of NFPA 70.
b. Mounting: Pedestal, surface-mounted.
c. Receptacles: Quadruplex, 5-20R, GFCI.on island benches as noted
d. Twist-Lock Receptacles: Single, L6-20R, GFCI. at Ceiling service panels (CSP)

E. Telecommunications: Manufacturer's standard complete fittings, in design compatible with electrical fittings.
1. See Section 260533.23 for surface raceway systems.
2. Devices provided, and wired by Owner's separate contractor.

2.11 SERVICE SPACE FRAMING

A. Support Framing Units: Galvanized steel framing units at space between back-to-back cabinets and between backs of cabinets and wall surfaces:
1. Manufacturer's standard assemblies.

2.12 MATERIALS

A. Sheet Steel: High-strength low-alloy, cold rolled and leveled unfinished steel sheet, ASTM A1008/A1008M, Class 1 (matte) finish.

B. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

2.13 FINISHES

A. Sheet Steel Finish: Having chemical resistance equal to Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8M. Test applied finishes using procedures specified in ASTM D522/D522M.
   1. Coating Type, New Casework: Baked on epoxy; minimum two coats.
   2. Color: As selected from manufacturer's standard selection.
   3. Preparation: Degrease and phosphate etch, and prime.

2.14 ACCESSORIES

A. Gas Cylinder Brackets: Restraint safety assemblies for laboratory gas cylinders.
   1. Regulatory Compliance: OSHA and NFPA.
   2. Bracket Mounting: Wall, with fasteners.
   3. Cylinder Capacity: Two
   4. Cylinder Diameter Capability: 4 to 12 inches (102 to 305 mm).
   5. Bracket Construction: 11 gauge, 0.119 inch (3.04 mm) hot-rolled steel.
   6. Steel Finish: Polyester powder-coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of support framing and anchors.

B. Verify that service connections are correctly located and of proper characteristics.

3.02 INSTALLATION

A. Perform installation in accordance with manufacturer's instructions and with SEFA 2.

B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.

C. Set casework items plumb and square, securely anchored to building structure, with no distortion.
   1. Base Cabinets: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 3/4 inch (19 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
   1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
   2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
   3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
   4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).

F. Separate dissimilar metals to prevent galvanic action.

G. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.

H. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

I. Vented Cabinets: Install in strict compliance with manufacturer's written installation instructions.
   1. Install vent kits and connect to exhaust system.
   2. Use only rigid materials for venting. No flexible materials permitted.

J. Replace units that are damaged, including those that have damaged finishes.

3.03 ADJUSTING

A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.04 CLEANING

A. Clean casework and other installed surfaces thoroughly.

3.05 PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.

B. Protect casework and countertops from ongoing construction activities. Prevent installers from standing on or storing tools and materials on casework or countertops.

C. Repair damage that occurs prior to Date of Substantial Completion, including finishes, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION 123553.13

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