

SECTION 123553 13 – STEEL LABORATORY CASEWORK AND RELATED PRODUCTS

PART 1 — DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

- A. Section Includes:
1. Use of **Lab Furniture LLC, STEELTECH COLLECTION Laboratory Furniture** as a steel casework specification standard, design, materials, construction, and finish of casework specified in the minimum acceptable standard of a universal steel laboratory casework line. Include delivery to the site, set in place, level, and scribe to walls and floors as required. Furnish and install all filler panels, knee space panels and scribes as shown on drawings.
 2. Furnish and deliver all electrical switches and receptacles, utility service outlet fittings as listed in these specifications, drawings, and equipment schedules as mounted on the laboratory furniture. Separately package all plumbing and electrical fittings that are not permanently installed in equipment. Mark for delivery to the installation site.
 3. Furnish and deliver, all laboratory sinks, cup sinks, drains, drain troughs, sink outlets, and integral tailpieces, which occur above the floor, and where these items are part of the equipment or listed in these specifications, equipment schedules, and drawings.
 4. Furnish service supports where specified and set in place; service tunnels, service turrets, supporting structures and reagent racks of the type shown on the drawings.
 5. Removal of all debris and dirt accumulated from installation of the laboratory furniture to an onsite container provided by others, leaving the premises broom clean and organized.
- B. Related Divisions:
1. Divisions 5 & 6: Behind-the-Wall Blocking and Studs
 2. Division 9: Base Molding
 3. Division 11: Chemical Fume Hoods
 4. Division 22: Plumbing
 5. Division 26: Electrical Fittings and Connections
 6. Division 27: Communications
- C. Related Publications:
1. SEFA 3 - Scientific Equipment and Furniture Association
 2. SEFA 8 - Scientific Equipment and Furniture Association
 3. NFPA 30 - National Fire Protection Association
 4. NFPA-45 - National Fire Protection Association
 5. UL - Underwriters Laboratories
 6. ASTM D522 - Bending Test

1.01 BASIS OF WORK

- A. It is the intent of this specification to use **Lab Furniture LLC – STEELTECH COLLECTION Laboratory Furniture** as the standard of construction for laboratory furniture. The construction standards of this product line shall provide the basis for quality and installation.
- B. Supply all equipment in accordance with this specification. Alternate products differing in materials and construction from this specification requires written approval from the

owner/architect. Procedures for obtaining approval for an alternate manufacturer are defined in section 1.03.B in this specification.

- C. General Contractors should secure a list of approved laboratory furniture manufacturers from the architect as protection against non-conformance to these specifications.
- D. All bidders have the option of clarifying deviations to the specified design, construction, or materials. Without such clarifications, sealed quotations to the owner or owner representative will be considered to be in total conformance to the requirements of the specification.

1.02 QUALITY ASSURANCE

- A. The steel laboratory furniture contractor shall also provide worktops and fume hoods all manufactured or shipped from the same geographic location to assure proper staging, shipment, and single source responsibility.
- B. General Performance: Provide certification that furniture shall meet the performance requirements described in SEFA 8.
- C. Finish Performance: Provide independent test lab certification that furniture shall meet the performance requirements described in section 2.05 of these specifications.

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's data and installation instructions for casework.
- B. Samples:
 - Samples from non-specified manufacturers will be required and reviewed per specification. Unless otherwise directed, approved sample units will be retained by the Owner's Representative.
 - 1. 6-inch- (150-mm-) square Samples for each type of countertop material. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests
 - 2. One full-size, finished base cabinet complete with hardware, doors, and drawers, but without countertop.
 - 3. One full-size, finished wall cabinet complete with hardware, doors, and adjustable shelves
 - 4. One Sample each of hinged and sliding doors.
 - 5. One of each service fitting specified, complete with accessories and specified finish.
 - 6. One of each type of sink and accessory item specified.
 - 7. Adhesives and sealants
- C. Shop Drawings:
 - Shop Drawings: For metal laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Coordinate shop drawings with other work involved
 - 2. Provide roughing-in drawings for mechanical and electrical services when required

PART 2 — PRODUCTS

2.00 MANUFACTURERS

- A. The basis of this specification is steel casework manufactured according to the standards used by **IQ Labs**, 1349 Eastlawn Rd SE, Grand Rapids, MI 49506. The specified design is PRO-LINE COLLECTION. All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than IQ Labs shall contain a review of the following capabilities:
1. List of shop facilities
 2. Proof of financial ability to fulfill the contract
 3. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
 4. Proof of project management and installation capabilities
 5. SEFA member in Good Standing
- B. The selected manufacturer shall warrant that all products be free of defects in material and workmanship for a period of one year. The purchaser shall notify the manufacturer's representative immediately of any product defects. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

2.01 CABINET MATERIAL:

- A. Steel:
Cabinet bodies, drawer bodies, shelves, drawer heads and door assemblies shall be fabricated from cold rolled steel.

2.02 DRAWER AND DOOR STYLE:

- A. Inset – Square Edge
Drawers and doors, when closed, shall be recessed to create an overall flush face with 1/8" reveals. The outer drawer and door head shall have a channel formation on all four sides to eliminate sharp raw edges of steel. The top front corners of the door shall be welded and ground smooth.

2.03 MATERIALS

- A. General Requirements:
It is the intent of this specification to provide a high-quality steel cabinet specifically designed for use in the laboratory environment.
- B. Steel:
1. Cold Rolled Steel:
Cold rolled sheet steel shall be prime grade 12, 14, 16, 18 and 20 gauge U.S. Standard; roller leveled, and shall be treated at the mill to be free of scale, ragged edges and deep scratches.
- C. Hardware and Trim:
1. Drawer and Door Pulls: (chose one)
 - a. Drawer and door pulls shall be mounted on 4" centers and be securely fastened to doors and drawers.
They shall be manufactured from: (chose one)
 - Pull Style 1 – Aluminum recessed
 - or
 - Pull Style 2 – 5/16" diameter steel rod finished in stainless steel
 - or

Pull Style 3 – Anodized aluminum in a flat rectangular shape

2. Sliding Door Pulls:
Sliding door pulls shall be Aluminum-Recessed
3. Hinges:
 - a. Inset 5-Knuckle Hinges:
Inset style cabinets shall use 5-Knuckle hinges made of Type 304 stainless steel .089 thick, 2-1/2" high, with brushed satin finish, and shall be the institutional type with a five-knuckle bullet-type barrel. Hinges shall be attached to both door and case with three screws through each leaf. Doors under 36" in height shall be hung on two (2) hinges, and doors over 48" in height shall be hung on three (3) hinges. Welding hinges to door or case will not be accepted. (*Note: meets SEFA 8 specifications*)
4. Drawer Slide:
 - a. Heavy duty, full extension, soft-close, self-closing, zinc plated, ball bearing slides, rated for 150-pound loads (See Drawer Assemblies in 2.04, option 1)
5. Locks:
 - a. Disk Tumbler:
Locks when shown or called for shall be a 5-disc tumbler with interchangeable cylinder. Exposed lock noses shall be nickel plated and stamped with identifying numbers.
6. Catches:
 - a. Nylon-roller spring loaded, self-aligning, catch with a steel strike plate. Double doors without locks shall have a catch on each door. Provide 2 catches on doors more than 48 inches (1200 mm) in height. Polyethylene roller type catches are not acceptable.
7. Shelf Clips:
Shelf adjustment clips shall be nickel plated steel and die formed.
8. Base Molding:
Base molding provided by others.
9. Label Holders:
Label holders, where called for, shall be self-adhesive type aluminum with satin finish and designed for 2-1/2" x 1-1/8" cards.
10. Sink Supports:
Sink supports shall be the hanger type, suspended from base cabinet end panels by four 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full-depth reinforcements, welded to the top of end panels. Two 3/4" x 1-1/2" x 12-gauge channels shall be hung on the threaded rods to provide an adjustable sink support.

2.04 CONSTRUCTION

- A. Steel Cabinet Construction:
 1. General:
 - a. The steel furniture shall be of modern design and shall be constructed in accordance with the best practices of the Scientific Laboratory Equipment Industry. Casework shall be insured by the use of proper machinery, tools, dies, fixtures and workmanship to meet the intended quality and quantity for the project.
 - b. All cabinet bodies shall be flush front construction with intersection of vertical and horizontal case members, such as end panels, top rails, bottoms and vertical posts in same plane without overlap. Exterior corners shall be mig welded with heavy back up reinforcements.

- c. Case openings of inset style cabinets shall be rabbeted on all four sides for both hinged and sliding doors to provide a dust resistant case.
 - d. All cabinets shall be free of burs and sharp edges and have a easily cleanable smooth interior.
 - e. Cabinets shall be designed using a standardized grid pattern to allow reconfiguration of doors and drawers.
2. Steel Gauges:
Gauges of steel used in construction of cases shall be 18-gauge, except as follows:
- a. Leveling glide reinforcements 12-gauge.
 - b. Top and intermediate front horizontal rails and reinforcement gussets, 16 gauge.
 - c. Drawer and door assemblies, cabinet bottoms, bottom back rail, toe space rail, and adjustable shelves 20-gauge.
- B. Base Cabinets:
1. End uprights shall be formed into not less than an L formation at top, bottom, back and a 3/4" wide front C formation. The pilaster shall be formed as part of the side panel creating a single piece structure and shall be perforated for the support of drawer channels, intermediate rails, hinge screws, and shelf adjustment holes.
 2. A 7/8" high top horizontal rail shall interlock with end panels and be flush at face of unit. Top rails not flush with face of end uprights are not acceptable.
 3. Intermediate rails shall be provided between doors and drawers. Rails shall be recessed behind doors and drawer fronts.
 4. The cabinet bottom shall be formed of one piece of steel, except in corner units, and shall be formed down on sides and back to create a square edge transition welded to cabinet base.
 5. Toe space rail shall extend up and forward to engage bottom panel to form a smooth surfaced fully enclosed toe space, 3" deep x 4" high.
 6. Back construction shall be three-piece system with vertical drawer/door support rail and two removable back panels.
 7. Each bottom corner of base cabinet shall have a 3/8"-16 leveling bolt, 2-1/2" long capable of supporting 500 lbs. Access to the leveling bolts shall be through cutouts in the cabinet bottom. Leveling bolt access using special tools or requiring cabinet to be lifted are not acceptable.
 8. Adjustable shelves shall be formed down 1/2", returned back 1/2" and up 3/8" into a channel formation front and rear and formed down 3/4" at each end. Shelves over 42" long shall be further reinforced with a channel formation welded to the underside of shelf. Shelves shall be adjustable on not more than 1" increments.
 9. Steel Door assembly for solid panel swinging doors shall consist of an inner and outer door pan. Outer door pan shall be formed at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel. Inner door pan shall be flanged at all four sides with hat channel support welded to the inside. The door assembly shall be 3/4" thick and contains sound deadening material. Door assemblies shall be painted prior to assembly and shall be punched for attaching pulls. The inner pan will have tabbed laser cut opening for in-field installation of locks when required.
 10. Doors shall be easily removed and hinges easily replaced if needed. Hinges shall be applied

to the cabinet and door with 10-24 screws. Welding of hinges to either cabinet or door will not be acceptable.

11. Drawer Assemblies: (Choose One)

- a. Drawer bodies shall be made in one-piece construction including the bottom, two sides, back and front. It shall be fully-coved at interior bottom on all four sides for easy cleaning. The top front of the inner drawer body shall be offset to interlock with the channel formation in drawer head. Drawer head should be 3/4" thick.

12. Knee space panels shall be 20-gauge steel construction, with same finish as base cabinets, and easily removable for access to mechanical service areas.

C. Special Purpose Storage Cabinets:

1. Acid Storage Fume Hood Cabinets:

Acid storage fume hood cabinets shall utilize the same gauges of steel and construction features as other base cabinets except they shall be completely lined with a one-piece polyethylene corrosion resistant liner. The liner shall be 1/4" thick, molded into a seamless tub, including top, sides and bottom, with a 1" lip at the bottom front to contain spills. Tubs shall include integral cleats at both ends and back to support an optional shelf. Each door shall have a set of louvers at the top and bottom and have a 1/8" sheet polyethylene liner. Where specified, each cabinet shall be vented into the fume hood with a 1-1/2" vent pipe allowing a positive airflow directly into the fume hood exhaust system. When specified or shown on drawings, cabinet shall include a full-depth phenolic resin.

2. Solvent Storage Cabinets:

3. Conform to OSHA Regulations and the requirements of NFPA 30, National Fire Protection Association, Flammable and Combustible Liquids Code. Cabinets shall be Factory Mutual (FM) 6050 approved and/or Underwriters Laboratories (UL) 1275 listed. Cabinets shall limit the internal temperature at the center, one inch (25mm) from the top to not more than 325 degrees Fahrenheit (162.8 degrees Celsius) when subjected to a ten-minute fire test that simulates the fire exposure of the standard time-temperature curve specified in NFPA 251. If cabinet is required to be vented by local authorities, provide 1-1/2" (38.1mm) diameter vented outlet with fire arrestor. Cabinet shall not be ventilated unless required by local authorities. Opening provided by the manufacturer shall be sealed with bungs. Bottom, top, back, door and sides of cabinet shall be constructed of metal and finished in the same manner as the metal casework herein before specified, provided that the bottom, top, door and sides of the cabinet shall be at least 18-gauge sheet steel and shall be double-walled, with 1-1/2 inch (38mm) air space. Joints shall be riveted, welded, or made tight by equally effective means. Flame arrestors must be present if cabinet ventilation is required. Adjustable, full width, metal shelf supported with "locking" clips to avoid inadvertent tipping. Doors shall be self-closing with a continuous piano hinge and three-point locking mechanism. Door sill spacing shall be raised at least 2 inches (50mm) above the bottom of the cabinet to retain spilled liquid within the cabinet. Finish as specified for metal laboratory casework except interior and shelf finish shall be three-mils thick. Apply signage, contrasting color, in a conspicuous size to cabinet doors indicating "FLAMMABLE KEEP FIRE AWAY."

4. Vacuum Pump Cabinets:

Vacuum pump cabinets will have the same specifications and construction standards as base cabinets. The interior of the cabinet shall be lined with a 1-inch-thick neoprene foam for sound deadening and easy cleaning and a interior pull out shelf provided for easy maintenance of pump system. Each cabinet shall be furnished with an electrical knockout for a duplex receptacle mounted on the inside cabinet back and a electrical knockout for a toggle switch mounted in the top front panel.

D. Upper Wall Cabinet Construction:

1. Upper cabinets shall have a completely finished interior same as exterior and shall be

hung with a French cleat so that no mounting hardware is visible on the interior when installed.

2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. The front edge of upright shall be 3/4" wide. The pilaster shall be formed as part of the side panel creating a single piece structure and shall be perforated for the support of drawer channels, intermediate rails, hinge screws, and shelf adjustment holes.
3. Cabinet tops shall be formed with a 7/8" high C formation at the front edge and turned down at the back to engage a wall hanging French cleat.
4. Cabinet false bottoms shall be formed down on all four edges and shall be removable.
5. Cabinet backs shall be welded on all 4 sides. Backs shall be perforated for shelf adjustment holes with holes being concealed at the back.
6. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear, formed down 3/4" at each end. Shelves over 36" long shall be reinforced with a hat channel welded to the bottom of shelf. Shelves shall be adjustable on not more than 1" increments.
7. Glazed doors shall be 3/4" thick and consist of an inner and outer door pan welded together to form a single unit. Outer door pan shall be 20-gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame opening at center of door. Inner door pan shall be 20-gauge steel, flanged at all four sides, and pierced for a glass opening in center of the door. Glass shall be held in place by a rubber or vinyl gasket around the entire edge of the glass. Doors shall be glazed with: (Choose one)
 - a. 1/8" float glassor
 - b. 1/8" tempered glassor
 - c. 1/4" safety glass
8. Solid panel doors shall consist of an inner and outer door pan. The outer door pan shall be formed into a channel or flanged shape at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides and reinforced with a hat channel for rigidity. The door assembly shall be 3/4" thick and contains sound deadening material.
9. Sliding doors shall rest on bottom steel track welded to cabinet utilizing nylon rollers. Track shall be designed to resist accidental removal of doors.
10. Swinging doors under 48" high shall be hung on one pair of hinges, doors over 48" high shall be hung on three hinges.
11. Plate glass doors shall operate on an extruded aluminum track at the bottom of the cabinet, and in an extruded aluminum channel at the top. The bottom of each glass door shall be furnished with a continuous aluminum shoe the full length of the door, which shall be equipped with two nylon rollers that operate on the extruded aluminum track. The aluminum shoes on the bottom of the plate glass doors shall be equipped with pulls for operation of the doors, and to prevent bypassing of the doors. Plate glass doors shall close against rubber bumpers. Plate glass doors shall be: (Chose one)
 - 1/4" float glassor
 - 1/4" tempered glass

or
1/4" safety glass

E. Steel Full Height Cabinet Construction:

1. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. The front edge of upright shall be 3/4" wide. The pilaster shall be formed as part of the side panel creating a single piece structure and shall be perforated for the support of drawer channels, intermediate rails, hinge screws, and shelf adjustment holes.
2. Cabinet tops shall be formed into a channel shape at front with flange at rear and sides and will be mig welded on all 4 sides. Front fascia channel shall be strengthened with mig weld reinforcements.
3. The cabinet bottom shall be formed of one piece of steel, except in corner units, and shall be formed down on sides and back to create a square edge transition welded to cabinet base.
4. Toe space rails shall interlock in back of bottom rail and with end panel to provide a welding plate and shall extend to the floor with a flange turned back and up for support.
5. Cabinet backs shall be mig welded on all 4 sides and be hemmed along edges for rigidity. The backs shall be perforated for shelf adjustment holes on not more than 1" centers.
6. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear; formed down 3/4" at each end. Shelves over 36" long shall be further reinforced with a hat channel formation spot welded to the underside of shelf. Shelves shall be adjustable on not more than 1" increments.
7. Glazed doors shall be 3/4" thick and consist of an inner and outer door pan welded together to form a single unit. The outer door pan shall be 20-gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" frame around the glass opening in the center of the door. The inner door pan shall be 20-gauge steel, flanged at all four sides, and pierced for a glass opening in center of the door. The inner pan will have a hat channel spot welded to the pan for additional rigidity. Door glazing shall be held in place by a rubber or vinyl gasket around the entire edge of the glass. Doors shall be glazed with: (Choose one)
 - a. 1/8" float glass
 - or
 - b. 1/8" tempered glass
 - or
 - c. 1/4" safety glass
2. Solid panel doors shall consist of inner and outer pan formations mechanically assembled after painting. All full height solid panel doors shall be further reinforced by a full-height hat channel formation welded to the inner pan. Doors shall be 3/4" thick and contain sound deadening material.
3. Sliding doors shall rest on bottom steel track welded to cabinet utilizing nylon rollers. Track shall be designed to resist accidental removal of doors.
4. Swinging doors under 48" high shall be hung on one pair of hinges, doors over 48" high shall be hung on three hinges.

B. Apron and Leg Assembly Construction:

1. In general, freestanding tables and/or apron and leg assemblies consist of welded leg

assemblies connected to aprons by mechanical fasteners.

2. Table apron rails shall be formed of 18-gauge steel with 4" high rails formed top and bottom into a C-channel.
3. Table legs shall be 2" square welded tubing. A threaded rivnut shall accommodate a 5/16"-18 x 2-1/2" long leveling glide.
4. Stretchers shall be constructed of 14-gauge steel tube and furnished where indicated on drawings. They will be secured to table legs as either fully welded assemblies or by use of a weld nut assembly using a 1/2"-13 bolt.

2.01 PERFORMANCE REQUIREMENTS

A. Steel Casework Construction Performance:

1. Steel base unit load capacity: 500 lbs. per lineal foot.
2. Suspended units: 300 lbs.
3. Drawers in a cabinet body: 150 lbs.
4. Utility tables (4 legged): 600 lbs. (with levelers) 300 lbs. (with casters)
5. Hanging wall cases: 300 lbs.
6. Load capacity for shelves of base units, wall cases and tall cases: 40 lbs. per square foot, maximum load – 200 lbs. up to 48" wide.
7. Mobile cabinets: 300 lbs

B. Steel Paint System Finish and Performance Specification:

1. Steel Paint System Finish:

After Cold Rolled Steel and Textured Steel component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.

After the phosphate treatment, the steel shall be dried, and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, ensuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance.

The completed finish system in standard colors shall meet the performance test requirements specified under SEFA 8 Metal Standards.

2. Performance Test Results (Chemical Spot Tests):

a. Testing Procedure:

Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide mouth bottle to retard evaporation.

All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77° ±3° F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

b. Test Evaluation:

Evaluation shall be based on the following rating system.

- Level 0 – No detectable change.
- Level 1 – Slight change in color or gloss.
- Level 2 – Slight surface etching or severe staining.
- Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

After testing, panel shall show no more than three (3) Level 3 conditions.

c. Test Reagents

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	Cotton ball & bottle
2.	Acetate, Ethyl	Cotton ball & bottle
3.	Acetic Acid, 98%	Watch glass
4.	Acetone	Cotton ball & bottle
5.	Acid Dichromate, 5%	Watch glass
6.	Alcohol, Butyl	Cotton ball & bottle
7.	Alcohol, Ethyl	Cotton ball & bottle
8.	Alcohol, Methyl	Cotton ball & bottle
9.	Ammonium Hydroxide, 28%	Watch glass
10.	Benzene	Cotton ball & bottle
11.	Carbon Tetrachloride	Cotton ball & bottle
12.	Chloroform	Cotton ball & bottle
13.	Chromic Acid, 60%	Watch glass
14.	Cresol	Cotton ball & bottle
15.	Dichlor Acetic Acid	Cotton ball & bottle
16.	Dimethylformamide	Cotton ball & bottle
17.	Dioxane	Cotton ball & bottle
18.	Ethyl Ether	Cotton ball & bottle
19.	Formaldehyde, 37%	Cotton ball & bottle
20.	Formic Acid, 90%	Watch glass
21.	Furfural	Cotton ball & bottle
22.	Gasoline	Cotton ball & bottle
23.	Hydrochloric Acid, 37%	Watch glass
24.	Hydrofluoric Acid, 48%	Watch glass
25.	Hydrogen Peroxide, 3%	Watch glass
26.	Iodine, Tincture of	Watch glass
27.	Methyl Ethyl Ketone	Cotton ball & bottle
28.	Methylene Chloride	Cotton ball & bottle
29.	Mono Chlorobenzene	Cotton ball & bottle

30.	Naphthalene	Cotton ball & bottle
31.	Nitric Acid, 20%	Watch glass
32.	Nitric Acid, 30%	Watch glass
33.	Nitric Acid, 70%	Watch glass
34.	Phenol, 90%	Cotton ball & bottle
35.	Phosphoric Acid, 85%	Watch glass
36.	Silver Nitrate, Saturated	Watch glass
37.	Sodium Hydroxide, 10%	Watch glass
38.	Sodium Hydroxide, 20%	Watch glass
39.	Sodium Hydroxide, 40%	Watch glass
40.	Sodium Hydroxide, Flake	Watch glass
41.	Sodium Sulfide, Saturated	Watch glass
42.	Sulfuric Acid, 33%	Watch glass
43.	Sulfuric Acid, 77%	Watch glass
44.	Sulfuric Acid, 96%	Watch glass
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	Watch glass
46.	Toluene	Cotton ball & bottle
47.	Trichloroethylene	Cotton ball & bottle
48.	Xylene	Cotton ball & bottle
49.	Zinc Chloride, Saturated	Watch glass

* Where concentrations are indicated, percentages are by weight.

3. Performance Test Results (Heat Resistance):
Hot water (190° F - 205° F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.
4. Performance Test Results (Impact Resistance):
A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.
5. Performance Test Results (Bending Test):
An 18-gauge steel strip, finished as specified, when bent 180° over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.
6. Performance Test Results (Adhesion):
Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".
7. Performance Test Results (Hardness):
The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the softest).

Pencils sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is, the hardest pencil that will not rupture the film, is then used to express or designate the hardness.

2.02 WORKSURFACES

- A. Materials: (Choose one or more and import information from WORKSURFACES spec.)
 1. Epoxy Resin Tops (Durcon)
 2. Phenolic Tops (Durcon)
 3. Stainless Steel

2.03 SINKS CUPSINKS, AND DRAINS

- A. Sinks: (Choose one or more and import information from SINKS, CUPSINKS, and DRAIN spec.)
 1. Molded Epoxy Resin Sinks
 2. Stainless Steel Sinks
- B. Cupsinks: (Choose one or more and import information from SINKS, CUPSINKS, and DRAIN spec.)
 1. Molded Epoxy Resin
 2. Polyethylene

PART 3 — EXECUTION

3.00 SITE EXAMINATION

- A. It is the responsibility of the owner/owner representative to ensure that the installation area is ready and conducive to the installation of the finished laboratory furniture. Review of critical dimensions and any special conditions have been verified and followed by the other contractors to assure the space is ready for installation.

3.01 INSTALLATION

- A. Preparation:

Prior to beginning installation of casework, check and verify that no irregularities exist that would affect quality of execution of work specified.
- B. Performance:
 1. Casework:
 - a. Install level, plumb and square with aid of leveling device on corner of each base cabinet. Where casework abuts other finished work, install fillers and scribe for accurate fit ensuring there are no visible gaps. Conceal all fasteners and shims.
 - b. Adjust top rails within 1/16" on a single plane. Fasten cabinets to framing, blocking or partitions within utility space. Bolt adjacent cabinets together ensuring joints are flush, tight and uniform.
 2. Worksurfaces:
 - a. Where required due to field conditions, scribe to abutting surfaces.
 - b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure the joints in the field, where practical, in the same manner as in the factory.
 - c. Secure worksurfaces to casework and equipment components with materials and procedures recommended by the manufacturer.
- C. Adjust and Clean:
 1. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.
 2. Adjust doors, drawers and other moving or operating parts to function smoothly.
 3. Clean finished casework applying touch up as required.
 4. Clean worksurfaces and leave them free of all grease and streaks.
 5. Area to be left broom clean and orderly.

D. Protection:

1. Provide protective measures to prevent casework and equipment from being exposed to other construction activity.
2. Advise owner and/or representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by other trades.