SECTION 12345 – EARTHLINE LABORATORY CASEWORK AND RELATED PRODUCTS

PART 1: DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:
   1. Using **Kewaunee Scientific Corporation, EarthLine Laboratory Furniture** as a casework specification standard, furnish all cabinets and casework, including tops, ledges, supporting structures, and miscellaneous items of equipment as listed in these specifications, or equipment schedules including delivery to the building, setting in place, leveling, scribing to walls and floors as required. Furnishing and installing all filler panels, knee space panels and scribes as shown on drawings.

   2. Furnishing and delivering all utility service outlet accessory fittings, electrical receptacles and switches, as listed in these specifications, equipment schedules or as shown on drawings as mounted on the laboratory furniture. The above-defined items shall be furnished with supply tank nipples and lock nuts, loose in boxes and properly marked. All plumbing and electrical fittings will be packaged separately and properly marked for delivery to the appropriate contractor.

   3. Furnishing and delivering, packed in boxes for installation by the mechanical contractor, all laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment or listed in the specifications, equipment schedules or shown on the drawings. Integral tailpieces when required shall be in accordance with the manufacturer's standards. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.

   4. Furnishing service strip supports and setting in place service tunnels, service turrets, supporting structures and reagent racks of the type shown on the details.

   5. Removal of all debris, dirt and rubbish accumulated as a result of the installation of the laboratory furniture to an onsite container provided by others, leaving the premises clean and orderly.

B. Related Divisions:

Divisions 5 & 6 :	Behind-the-Wall Blocking and Studs
Division 9 :	Base Molding
Division 11:	Chemical Fume Hoods
Division 15 :	Plumbing
Division 16 :	Electrical Fittings and Connections

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 Laboratory
   6. ASTM D552 - Bending Test

1.01 BASIS OF WORK

It is the intent of this specification to use **Kewaunee Scientific Corporation, EarthLine Laboratory Furniture** as the standard of construction for laboratory furniture. The construction standards of this product line shall provide the basis for quality and functional installation.

Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval from the owner/architect. This approval must be obtained seven (7) days before the quotation deadline.

Procedures for obtaining approval for an alternate manufacturer are defined in section 2.00.C in this specification.

General Contractors should secure a list of approved laboratory furniture manufacturers from the architect as a protection against non-conformance to these specifications.

Participants in the quotation process 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 construed as being in total conformance to the requirements of the specification.

The owner / owner representative reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.

1.02 QUALITY ASSURANCE

A. The laboratory furniture contractor shall also provide work tops 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 the furniture finish shall meet the performance requirements described in section 2.03 of these specifications.

1.03 SUBMITTALS

Manufacturer's Data: Submit manufacturer's data and installation instructions for each type of casework. Provide data indicating compliance with SEFA 8 Standard.

Samples: Samples from non-specified manufacturers will be required and reviewed per specification. Samples shall be delivered, at no cost to the architect or owner to a destination set forth by the architect or owner. This must be done seven (7) days before quotation deadline as a condition of approval of each bidder. Samples shall be full size, production type samples. Miniature, or "Show Room" type samples are not acceptable. Furnish the following:

1. One combination drawer and cupboard base unit showing complete construction details, including one shelf.
2. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests.
3. Sample of all mechanical service fittings, locks, door pulls, hinges, and interior hardware.

Shop Drawings:
Submit shop drawings for furniture assemblies showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fittings.
Coordinate shop drawings with other work involved.
Provide roughing-in drawings for mechanical and electrical services when required.

PART 2 – PRODUCTS

2.00 MANUFACTURERS

A. The basis of this specification is renewable product casework manufactured according to the standards used by **Kewaunee Scientific Corporation**, 2700 Front Street, Statesville, North Carolina. The specified design is **EarthLine**. 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 Kewaunee Scientific Corporation shall contain a review of the following capabilities:

1. List of shop facilities
2. List of engineering and manufacturing personnel
3. Proof of financial ability to fulfill the contract
4. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
5. Proof of project management and installation capabilities

B. The selected manufacturer must warrant for a period of one-year, starting on the date of acceptance or occupancy, whichever comes first, that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. 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.

C. All manufacturers other than those mentioned in section 2.00.A. must submit samples made in accordance with this specification. Samples shall be delivered at no cost to the architect or owner to a destination set forth by the architect or owner. Sample delivery must be done seven (7) days before the quotation deadline. Samples shall be full size, production type samples. Miniature, or "Show Room" type samples are not acceptable.

1. One sample 36" base cabinet with two doors and two drawers with black epoxy top.
2. One 36" acid storage base cabinet typical of specified elevations.

D. The above samples of the successful manufacturer will be impounded by the architect or owner to insure that material delivered to the jobsite conforms in every respect to the samples submitted.

2.01 MATERIALS

A. General:

Material shall be selected so that the finished installation shall provide an attractive and harmonious appearance. All exterior casework surfaces exposed to view after installation, and cabinet interior surfaces exposed to view when doors and drawers are in the open position, shall be: (pick one)

Red Oak
White Maple
American Lyptus
Natural Bamboo
Carmelized Bambo

Veneers exposed to view after completion of installation shall be of color and graining in conformance with the normally accepted standards required of the Scientific Laboratory Equipment Industry.

*NOTE: Henceforth, all specification language refers to **Red Oak**. If **White Maple, American Lyptus, Natural Bamboo,** or **Carmelized Bamboo** is desired, specification can be read with **White Maple, American Lyptus, Natural Bamboo,** or **Carmelized Bamboo** substituted for **Red Oak**.*

B. MDF Core Plywood:

All plywood shall be 3-ply, A-1 plain sliced, slip matched Red Oak, fiberboard core and shall be compliant with ANSI/HPVA HP-1 2004 - 3.13 ; 3.15. Fiberboard shall be manufactured from SCS and EPP certified, no-added formaldehyde,100% recovered and recycled wood fiber

C. Hardboard:

Hardboard shall be a wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface.

D. Cold Rolled Steel:

Cold rolled sheet steel shall be prime grade U.S. Standard; roller leveled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other injurious effects. No less than

25% of the steel by weight shall be recycled material.

E. Galvanized Steel:
Galvanized steel shall be hot dipped, extra smooth, G90, and shall be free of scale, ragged edges, deep scratches or other injurious effects.

F. Glass:
Glass used for unframed sliding doors, shall be 1/4" float glass.

G. Hardware and Trim:

1. Drawer and Door Pulls:
Drawer and door pulls shall be mounted on 4" centers, offering a comfortable hand grip, and be securely fastened to doors and drawers. They shall be manufactured from: (pick one)

Anodized aluminum in a shallow rounded shape.
or
Anodized aluminum in flat rectangular shape.
or
5/16” diameter steel rod finished with a black epoxy paint.
or
5/16” diameter steel rod finished with a white epoxy paint.
or
3/8” diameter stainless steel rod with a brushed satin finish.
or
5/16” diameter chrome plated brass rod with a brushed satin finish.

Use of plastic pulls (molded or extruded), or a design not compatible for usage by the handicapped shall be unacceptable.

2. Hinges:
Hinges shall be the five (5) knuckle, satin finish stainless steel, institutional, offset type for all swinging doors. Hinges shall be 2-1/2" long, and secured to cabinet and doors with flathead screws, so applied to withstand a weight load of 150 lbs. minimum.

3. Locks:
Disk Tumbler:
Locks when shown or called for shall be a National Lock, 5-disc tumbler with heavy duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity for 225 primary key changes. Master key one level with the potential of 40 different, non-interchangeable master key groups.
or
Pin Tumbler:
Locks when shown or called for shall be a National Lock, pin tumbler with heavy duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity of at least 1000 primary key changes, and the capacity to be Masterkeyed, Grand-masterkeyed, Sub-masterkeyed, and Mason Keyed.

4. Roller Catches:
Roller Catches shall have a spring-loaded polyethylene roller and a steel strike plate.

5. Elbow Catches:
Elbow catches and strike plates shall be cast aluminum with bronze finish.

6. Drawer Slides:
Drawer slides shall be rated at 150 pounds minimum. They shall consist of 2 sections providing a quiet, smooth operation on ball bearing nylon rollers, shall be self-closing from a point 5" open, and shall incorporate a double stop, lock open feature. The case channels shall maintain alignment of the drawer and provide an integral drawer stop, while allowing the drawer to be removable without the use of tools. Drawers shall provide at least 13-3/4" front to

back clearance when fully extended and shall rise when opened thus avoiding friction with lower drawers and/or doors. Case channels shall be galvanized steel, drawer channels shall be painted cold rolled steel.

7. Dowels:
   Dowels used to join frames and panels shall be fluted hardwood not less than 3/8" in diameter.

8. Shelf Support Clips:
   Shelf support clips shall be twin pin type for mounting on interior of cabinet end panels. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves shall be adjustable on 32mm centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.

9. Base Molding:
   Base molding shall be provided by others.

10. Label Holders:
    Label holders, where shown or called for, shall be an aluminum brad-attached type with satin finish and designed for 2-1/2" x 1-1/8" cards, unless otherwise specified.

11. Number Plates:
    Number plates, where shown or called for, shall be aluminum brad-attached type with satin finish and indented black lettering.

12. Sink Supports:
    Sink Supports, where required, shall be of a cradle type consisting four 1/4" steel rods attached to the cabinet end panels.

13. Support Struts:
    Support struts shall consist of two 16 gauge channel uprights fastened top and bottom by two adjustable "U" shaped spreaders, each 12 gauge, 1-1/2" x length required. Struts shall be furnished to support drain troughs, and to support work top at plumbing space under fume hood superstructures or other heavy loads. They shall be fabricated so as to accept industry standard, pipe and conduit hangers.

2.02 CONSTRUCTION

A. General Requirements:
   It is the intent of this specification to provide a high quality cabinet specifically designed for the laboratory environment. The cabinet shall be full overlay construction with 3/4” thick door and drawer fronts. The exposed face of doors and drawer heads shall be vertical matching grain, with all doors and drawer heads for each cabinet cut from a single sheet of mdf core plywood. The door and drawer heads shall occupy a plane extending 3/4" past the plane of the front of the cabinet body, shall be square edged. and shall overlay the face of the cabinet leaving minimal reveals. All cabinet end panels shall be finished for the purpose of future relocation unless cabinet is selected with the “unfinished end” option.

B. Base Cabinets:
   1. Panels and Rails:
      All cabinet end panels shall be 3/4" thick Red Oak mdf core plywood with 1/8" thick Red Oak facing on exposed vertical edges and bottom horizontal edge. Bottom panels and toe space rails shall be 3/4" thick Red Oak mdf core plywood with 1/8" thick Red Oak facing on exposed edges. Top panels shall be 1" thick Red Oak mdf core plywood with 1/8" thick Red Oak facing on exposed edge. End panels shall be multiple doweled, glued, and screwed to top panel, bottom panel and toe space rail. Cupboard base cabinet shelves shall be full-width adjustable, 3/4" thick, formed, 20 gauge, painted, cold rolled steel. Shelves shall be adjustable on 32mm centers utilizing shelf support clips. Integrally joined parts shall result in a totally enclosed cabinet.

Sink cabinets shall be made without a top panel.

2. Backs:
   Cabinet backs shall be 1/4" thick hardboard, dadoed into end panels and securely fastened to cabinet bottom and top panels. Backs that are attached to end panels with cleats shall be unacceptable.

3. Intermediate Rails: (Optional)
   Intermediate rails when specified shall be 3-1/4" x 3/4" mdf core plywood with 1/8" thick Red Oak facing on exposed edge. Rails shall be screwed to end panels. Intermediate rails shall be mounted at the front between the drawers and between all drawers and doors.

4. Drawers Bodies:
   Drawer bodies shall be 20 gauge, painted, cold rolled steel, made in a one-piece construction including the bottom, two sides, back and front. They shall be fully coved at interior bottom on all four sides for easy cleaning.

5. Drawer Heads:
   Drawer heads shall 3/4", Red Oak mdf core plywood with 1/8" Red Oak edging and shall be mounted to the front of the steel drawer bodies. Each drawer head under 30" wide shall have one pull mounted horizontally, drawer heads 30" and over shall have two pulls.

6. Doors:
   Doors shall be 3/4", Red Oak, mdf core plywood with 1/8” Red Oak edging, mounted on cabinet with 1 pair of offset hinges and shall be latched with a roller catch. Double doors shall have a roller catch on each door. Each door shall have one pull mounted vertically. Locks, when required on double doors, shall be mounted on the right-hand door and the left-hand door shall have a Red Oak astragal.

C. Special Purpose Base Cabinets:

1. Acid Storage Fume Hood Cabinet:
   Acid storage fume hood cabinets shall utilize the same materials and construction features as other base cabinets. In addition, they shall have a one piece liner insert made of linear low density polyethylene. The liner insert shall form a one-inch high pan at the bottom to retain spillage. The door shall be lined with a polyethylene sheet. Each cabinet shall be vented with a 1-1/2" vent pipe. It shall provide a positive airflow directly into the fume hood exhaust system.

2. Solvent (Flammable) Storage Cabinet:
   Solvent storage cabinets shall be constructed in accordance with OSHA, UL, and NFPA 30 standards. They shall meet the National Fire Protection Association, Flammable and Combustible Liquid Code and shall be UL listed with a UL label affixed to the inside of the cabinet door. Cabinet bottom, top, back, door(s) and sides shall be 1-inch exterior grade veneer core plywood. All joints shall be rabbetted and fastened in two directions with wood screws. Cabinet backs shall be removable for access to utility chase from inside the cabinet, and shall have two threaded, two-inch pipe vent outlets, with flame arrestors and capped for venting as required by local code. Doors shall be hinged with a pair of five-knuckle hinges, latched with a manual three-point latch, and shall overlap by 1” on cabinets with more than one door. The door sill shall be raised at least two inches above the cabinet bottom. Each cabinet shall include two, two-inch deep, removable liquid-tight, powder-coated steel pans to retain spills. One shall be at the bottom of the cabinet, the other mounted on adjustable shelf clips as a shelf. All solvent storage cabinets shall be marked with conspicuous, two-inch high lettering: FLAMMABLE – KEEP FIRE AWAY.

D. Counter Mounted and Wall Mounted Cabinets:
   1. Cabinet:
      All cabinet end panels shall be 3/4" thick Red Oak mdf core plywood with 1/8" Red Oak facing

on front edges. Tops and bottoms shall be 1" thick Red Oak mdf core plywood with 1/8” Red Oak facing on exposed edges, multiple doweled into end panels, and secured with glue and countersunk screws. Shelves shall be 3/4” thick, formed, 20 gauge, painted, cold rolled steel. Shelves shall be adjustable on 32mm centers utilizing shelf support clips. The backs in open and sliding plate glass door cases shall be 3/8" Red Oak mdf core plywood while the back not exposed to view shall be 1/4" hardboard.

2. Doors:
   a. Sliding Plate Glass Doors:
      Solid glass doors shall be 1/4" thick float glass with polished edges. Doors shall be set in an aluminum bottom frame containing roller bearings and held in position with an aluminum guide at the top of the case.

   b. Swinging Doors:
      Doors shall be 3/4", Red Oak, mdf core plywood with 1/8” Red Oak edging.
      Doors shall be hung on 1 pair of offset hinges and shall latch with a roller catch. Double doors without locks shall have a roller catch on each door. Double doors with locks shall have an elbow catch and Red Oak astragal mounted to the left-hand door and the lock and a roller catch mounted on the right-hand door.

E. Full Height Storage Cabinets:
   1. Cabinet:
      All cabinet end panels shall be 3/4" thick Red Oak mdf core plywood with 1/8" Red Oak facing on exposed vertical edges and bottom horizontal edge. Tops shall be 1" thick Red Oak mdf core plywood with 1/8” Red Oak facing on exposed edge, multiple doweled into end panels, secured with glue and countersunk screws.

      Adjustable shelves shall be 3/4" thick, formed, 20 gauge, painted, cold rolled steel and shall be adjustable on 32mm centers utilizing shelf support clips. To assure a completely rigid case, a fixed center shelf of 1" thick Red Oak mdf core plywood with 1/8” Red Oak facing on exposed edge, shall be multiple doweled into end panels, secured with glue and countersunk screws.

      Cabinet bottoms shall be 3/4" thick Red Oak mdf core plywood, multiple doweled and glued securely to end panels. All cabinets 22" in depth shall have a 3/4" x 3-3/4" Red Oak mdf core plywood toe space rail to form a 4" high toe space. Cabinets 16" deep shall use a 1" x 4-1/2" Red Oak mdf core plywood base rail mounted flush with the face of the cabinet. The backs in open cabinets shall be 3/8" Red Oak mdf core plywood while backs not exposed to view shall be 1/4" hardboard. Cabinet interior shall be flush.

   2. Doors:
      Doors shall be 3/4", Red Oak, mdf core plywood with 1/8” Red Oak edging. Each door shall have one pull mounted vertically, shall be hung on 1-1/2 pair of offset hinges, and shall latch with a roller catch. Double doors without locks shall have a roller catch on each door. Double doors with locks shall have an elbow catch and Red Oak astragal mounted to the left-hand door and the lock and a roller catch mounted on the right-hand door.

2.03 FINISH AND PERFORMANCE REQUIREMENTS

A. Environmental Standards:
   The finish must be low VOC and reclaimable with enclosed spray and/or roll coat application; thus providing an environmentally responsible product.

B. MDF Core Plywood and Hardboard Finish:

   1. Wood Surface Preparation:
      Prior to application of wood finish, all cabinet component surfaces shall be sanded smooth to

remove loose fibers, scratch marks, and abrasions, with all dust thoroughly removed.

2. Wood Finish Application:
   Cabinet components shall be finished using a state of the art flat-line system. The finish shall be applied under controlled conditions prior to casework assembly and attachment of hardware. This will provide maximum coverage and protection to the assembled product. The finish shall be fully UV cured to ensure proper performance.

3. Interior Wood Casework Finish:
   Interior surfaces shall receive two applications of chemical-resistant, UV cured, epoxy top coat. The first application will be cured, sanded, and cleaned. The final top coat will then be applied and fully cured.

4. Exterior Wood Casework Finish:
   Exposed exterior surfaces, and interiors of glazed cabinets and open cabinets shall be stained and additionally sealed with two applications of chemical-resistant epoxy top coat. The fully reclaimable low VOC water-borne stain shall be uniformly applied by a series of automated spray applicators. The stained components shall then travel through a series of heated chambers to incrementally achieve a temperature of 140 degrees F to dry the stain material. The first of two low VOC epoxy top coats shall be applied, cured, sanded, and cleaned. The final top coat will then be applied and UV cured, providing a semi-gloss sheen. The completed product shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS, paragraph 2.03 sub-paragraph D. and SEFA.

C. Steel Finish:
   After cold rolled steel component parts have been completely fabricated 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, insuring 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 PERFORMANCE TEST RESULTS paragraph 2.03 sub-paragraph D. and SEFA.

D. Performance Test Results (Chemical Spot Tests):
   1. 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.

2. 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.

3. 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.	Dimethylformanide	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 Cloride	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.

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E. 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.

F. 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 a 3/4" thick plywood panel supported underneath by a solid surface and 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.

G. Performance Test Results (Moisture Resistance) (Plywood only):
A cellulose sponge (2" x 3" x 1") shall be soaked with water and placed on the finished surface for a period of 100 hours. The sponge shall be maintained in a wet condition throughout the entire test period. At the end of the test period, the surface shall be dried and no visible effect shall be shown on the finish.

H. Performance Test Results (Bending Test) (Steel only):
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.

I. Performance Test Results (Adhesion) (Steel only):
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".

J. Performance Test Results (Hardness) (Steel only):
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).

The pencils shall be 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.

2.04 WORKSURFACES

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

4. Hardwood / Natural Finish
5. Hardwood / Penetrating Oil Finish

B. Performance Requirements (Choose one or more and import information from WORKSURFACES spec.):

2.05 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 (Import information from SINKS, CUPSINKS, and DRAIN spec.):

C. Drain Troughs (Import information from SINKS, CUPSINKS, and DRAIN spec.):

2.06 FITTINGS

A. Materials (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec):
1. Chrome-plated red brass or bronze
2. Plastic-coated red brass or bronze

B. Construction (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec):
1. Valves:
   a. Front-loaded valves
      1) Water
      2) Steam
      3) Distilled Water
      4) Ground key dry service
      5) Needle valve dry service

   b. Rod-driven remote control valves
      1) Water
      2) Steam
      3) Distilled Water
      4) Needle valve dry service

2. Outlets
   a. Goosenecks
   b. Aerator outlets
   c. Tank nipples
   d. Sink outlets

3. Miscellaneous
   a. Crumb cup strainers
   b. Vacuum breakers

C. Performance (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec):

1. Maximum line pressures
   a. Laboratory ball valves
   b. Needle point cocks
   c. Vacuum valve
   d. Water (H&C) valve

e. Steam valve

2. Sepia bronze finish performance

PART 3 - EXECUTION - LABORATORY CASEWORK AND RELATED PRODUCTS

3.00 SITE EXAMINATION

A. The owner and/or his representative shall assure all building conditions conducive to the installation of a finished goods product; all critical dimensions and conditions previously checked have been adhered to by other contractors (general, mechanical, electrical, etc.) to assure a quality 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. Coordination:
Coordinate the work of the Section with the schedule and other requirements of other work being performed in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.

C. Performance:
1. Casework:
   a. Set casework components plumb, square, and straight with no distortion and securely anchor to building structure. Shim as required using concealed shims.
   b. Screw continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16" tolerance.
   c. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.
   d. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8" between top units.

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.

D. 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 shop finished casework; touch up as required.

4. Clean worksurfaces and leave them free of all grease and streaks.

5. Casework to be left broom clean and orderly.

E. Protection:
1. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.

2. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.