SECTION 123653 – LABORATORY COUNTER TOPS, SINKS AND PEGBOARDS

PART 1 — DESCRIPTION OF WORK

1.01 SUMMARY AND SCOPE

A. Section Includes:
   1. Counter Tops
      a. Epoxy resin counter tops
      b. Environmentally friendly epoxy resin counter tops
      c. Plastic laminate counter tops
      d. Stainless steel counter tops
      e. Hardwood counter tops
   2. Accessories
      a. Sinks
      b. Cupsinks
      c. Troughs
      d. Pegboards
      e. Joint adhesive

B. Related Sections;
   1. Division 06 Millwork and Rough Carpentry
   2. Division 11 Laboratory Fume Hoods
   3. Division 12 Laborartory Casework
   4. Division 12 Laboratory Fixtures

1.02 REFERENCES

A. SEFA 3 – Scientific Equipment and Furniture Association
B. ASTM International

1.03 SUBMITTALS

A. Shop Drawings:
   1. Approval drawings shall be submitted on pages no less than 11” x 17” and 3/8” scale.
   2. Drawings shall include but not be limited to:
      a. overall counter top size
      b. dotted-in base cabinet and knee space locations
      c. sink size and sink cutout locations
      d. fixture drilling size and locations
      e. column cutouts
      f. all counter top cutout and drilling size and locations and seam locations
   3. As most practical, seams shall be located at the intersection of base cabinets.
   4. Seams shall not be placed in knee space areas and as far from sinks as practical.
   5. Counter top sizes shall be of the largest practical size while allowing delivery into the building, floor and room.
   6. Any one particular counter top piece should weigh no more than 350 lbs.

B. Field Dimensions
   1. Dimensions shall be field verified prior to fabrication by qualified factory or dealer representative to ensure proper fit of fabricated and delivered materials.
   2. Field dimensions are to be transferred to production and final drawings.

C. Product Data
   1. Submit product data that details material origin and design, thickness, durability, performance test results, specification, edge design and color availability.

D. Samples
   1. Epoxy samples shall be no less than 1” thick x 4” x 4” or 1" thick x 2" x 2"
   2. Samples shall be clearly marked with manufacturer name and product specifics.

E. Test Reports
   1. Submit 3rd party test reports showing evaluations and adherence to the most current SEFA 3 qualifications.

F. LEED Applications
   1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
   2. Regional Materials: Certify products extracted, processed, and manufactured within 500 mile radius of Project site.
   3. Low-Emitting Materials: Certify volatile organic compound (VOC) content.
G. Closeout Submittals:
   1. Submit owner's manual and recommended maintenance information.

1.04 DELIVERY, STORAGE AND HANDLING

A. Delivery
   1. Materials shall only be delivered to a jobsite after internal atmosphere condition has occurred, ceiling grid is installed and drywall has been painted.
   2. Storage of epoxy tops in outside conditions is only acceptable when extreme temperatures and weather conditions are not present.
   3. Tops must be covered and away from UV exposure.
B. Storage
   1. Epoxy tops shall be stored vertically or horizontally as per manufacturers' recommendations.
   2. In all cases, tops shall be properly supported to eliminate bending and warping of stored materials.
   3. Tops shall be stored on oversized pallets of a size suitable to support the size and weight of all combined materials.
   4. Top corners and edges are to be additionally protected using heavy thickness cardboard or plastic material.
C. Handling
   1. Epoxy tops are heavy and shall be handled by qualified machinery or personnel to ensure personal, product and peripheral safety.
   2. Tops are to be removed from pallets without causing scratches or damage to other tops.

PART 2 – PRODUCTS

2.01 MANUFACTURES

A. Epoxy counter tops shall be Kemresin as supplied by Kewaunee Scientific located in Statesville, NC. Substitutions may be accepted after following the substitution request as found in Division 1 documentation. In all cases, counter tops shall be manufactured by the same Division 12 casework and Div 11 fume hoods manufacturer.

B. Qualified manufacturers shall have 10+ years of documented and successful installations. Manufacturers shall have United States based modern production facility consisting of loading docks, material handling, raw material formulation, pour, bake, setting, CNC manufacturing and storage capabilities. Qualified manufacturer shall employ the use of a closed mold system.

2.02 MATERIALS

A. Epoxy resin shall be a monolithic poured material consistent throughout material thickness. The finished surface shall have a smooth finish resulting in enhanced stain, scratch and abrasion resistance.

B. Minimum sheen level shall be between 10-70 GU at 60°.

2.03 WORKSURFACES

A. Epoxy Resin Tops (**Kemresin**):
Epoxy Resin tops shall consist of modified epoxy resin that has been especially compounded and cured 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 shall be 1" thick, exposed edges with a 1/8”, 45 degree bevel on top and bottom and drip grooves provided on the underside at all exposed edges. 4" high curbs at the backs and ends of tops shall be 1" thick and bonded to the deck to form a square watertight joint. Sink cutouts shall be smooth and uniform without saw marks with the top edge beveled. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than 3/4"

Color to be [choose one]:
- Black
- Grey
- Putty
- Slate

B. Environmentally Friendly Epoxy Resin Tops (**EarthResin**):
Environmentally Friendly Epoxy Resin tops shall consist of modified epoxy resin that has been especially compounded and cured 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. A minimum of 10% (by weight) shall be post-consumer recycled material. Tops shall be 1" thick, exposed edges beveled top and bottom, and drip grooves provided on the underside at all exposed edges. 4" high curbs at the backs and ends of tops shall be 1" thick and bonded to the deck to form a square watertight joint. Sink cutouts shall be smooth and uniform without saw marks with the top edge beveled. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than 3/4"

Color to be [choose one]:
- Black

Grey
Putty
Slate

C. Plastic Laminate Tops:
Plastic laminate tops and back-splash shall be built up using a .035" thick plastic surface (of the color and pattern selected), attached to the sub-top with a water resistant adhesive. Substrate shall be of 40-45 lbs. medium density particle board to make a finished top thickness of 1". All exposed edges shall be 3mm PVC banded unless otherwise specified. Underside of top shall be sealed using a balance or backer sheet.

D. Stainless Steel Tops:
Stainless steel tops and working surfaces shall be Type 304 stainless steel unless otherwise specified. All exposed surfaces shall be 16 gauge stainless steel reinforced on the underside by 16 gauge carbon steel channels, so spaced as to prevent twisting, oil-canning or buckling. Exposed edges of tops shall be formed into a 1" thick channel shape. Back and side splashes shall be formed from the same sheet as the top or so welded thereto that they form integral parts thereof. Top edges of curbs and splash-backs shall be formed into a channel shape. Unless otherwise shown or called for, all tops having built-in sinks shall have a raised rim/marine edge 1" wide on all edges. Where stainless steel sinks are supplied, the sink bowl shall be so welded to the top as to form an integral part thereof. All welds shall be ground smooth and polished to a uniform satin finish over the entire top and sink assembly. Soldering of the sinks, curbs or splash rails to the top will not be permitted. Mechanical joints or field joints, where made necessary by size, shall be a tight butt joint of the top surfaces, reinforced and held in alignment with steel reinforcements. After fabrication and polishing, surfaces of the tops shall be covered to provide protection during shipment and installation. Underside of tops and sinks shall be coated with a plastic sound deadener.

E. Hardwood Tops (Natural Finish):
Wood tops shall be 1" thick and shall be built up of maple strips, finger joint construction, in a natural finish, using urea resin glue and electronically cured. All tops shall have a 1/4" wide by 1/8" deep drip groove on underside and all exposed top edges and corners shall be radiused 1/4". One coat of sealer shall be applied to all surfaces. Finish shall consist of a highly water and abrasion resistant synthetic varnish, baked between coatings, with a final baking at 130 degrees F. The result shall be smooth semi-gloss surface.

F. Hardwood Tops (Penetrating Oil Finish):
Wood tops shall be 1" thick and shall be built up of maple strips, finger joint construction, in a penetrating oil finish, using urea resin glue and electronically cured. All tops shall have a 1/4" wide by 1/8" deep drip groove on underside and all exposed top edges and corners shall be radiused 1/4". Finish shall consist of two coats of penetrating resin-oil combination. The first coat shall be applied and allowed to penetrate with excess oils being wiped off and allowed to cure before the application of the second coat which shall be similarly treated. The result shall be an evenly penetrated surface.

2.04 ACCESSORIES

A. Manufacturer to provide a full range of matching epoxy products including but not limited to; single poured dished fume hood counter tops, sinks, cupsinks, troughs and pegboards.

B. Molded Epoxy Resin Sinks (Kemresin)
1. Sinks shall be molded of modified epoxy resin, carefully compounded with selected materials to provide maximum physical and chemical properties.
2. Sinks shall possess a high resistance to mechanical and thermal shock.
3. All inside corners to be coved and the bottom pitched to the drain outlet.

4. Manufacturer shall supply a full range of epoxy poured, single piece epoxy sinks available in manufacturers' standard colors.
5. Sinks shall be one piece and be available in under-mount or drop-in configurations.
6. Sink outlets shall be supplied loose and to be installed by respective trades.
7. Sink traps to be furnished and installed under Division 23 trade.

C. Stainless Steel Sinks
1. Stainless steel sinks shall be Type 304 stainless steel, except in photographic developing sinks where Type 316 stainless steel shall be used.
2. All exposed surfaces shall be finished in a No. 4 finish.
3. Sinks shall be 18 gauge metal unless heavier gauges are specified or dictated by construction requirements.
4. All sink joints shall be continuously welded by the heliarc welding process.
5. Inside radii shall be 1-1/8".
6. Bottoms shall be pitched to the drain indent.
7. Sink bowl shall be so welded to the top as to form an integral part thereof where sinks are built into stainless steel tops or working surfaces.
8. Top edges of free standing sinks shall be formed into a channel formation with all joints welded and ground smooth and polished.
9. No soldering will be permitted in connection with sink construction.
10. Stainless steel sinks shall be furnished with crumb cup strainers unless otherwise specified.

D. Molded Epoxy Resin Cup Sinks (Kemresin)
1. Molded Epoxy Resin cup sinks shall be molded in one-piece of the same resin as specified for Molded Epoxy Resin sinks.
2. Shall have an integral mounting flange and a 1-1/2" I.P.S. male straight thread outlet.

E. Polyethylene Cup Sinks
1. Molded polyethylene cup sinks shall be molded in one-piece of acid-resistant polyethylene.
2. Shall have an integral mounting flange and an integral tailpiece with an 1-1/2" I.P.S. male straight thread outlet.

F. Molded Epoxy Resin Drain Troughs
1. Molded Epoxy Resin drain troughs shall be molded of the same resin as specified for Molded Epoxy Resin sinks.
2. Troughs shall have not less than 1/8" per foot pitch to the drain or discharge end.
3. For ease of cleaning, the junction between the sides and bottom shall be seamless and have not less than a 3/4" radius.

G. Pegboards
1. Manufacturer shall supply epoxy pegboards matching epoxy counter tops.
2. Pegboards to be 1" thick.
3. Exposed edges with 1/8", 45 degree beveled chamfer and finished.
4. Back of pegboard, when exposed, to be finished.
5. Pegboard to be factory machined to accept polypropylene pegs. Pegs shall be supplied with pegboard.
6. Standard line of products shall include an applied drip trough made of epoxy resin or stainless steel.
7. Drip trough shall include a means to attach a drain tube. Drain tube shall be included when a drip trough is purchased.

H. Field joint epoxy
1. Field joints to be filled using Smooth-On PC3 as manufactured by Smooth-On East Texas, PA. www.smooth-on.com

I. Sink Outlets
Sink outlets for molded epoxy resin sinks shall be molded polyethylene, with integral cross bars, tapered for overflow and be complete with gasket and lock nut with 1-1/2" I.P.S. male straight thread outlet. Overflows shall not be furnished for sink outlets unless specifically called for.

J. Crumb Cup Stainers
Crumb cup strainers shall be stainless steel or chromium plated brass, as specified, and shall be furnished for stainless steel sinks, and be complete with gasket, lock nut and 4" long unthreaded tailpiece outlet in 1-1/2" size

2.05 PERFORMANCE

A. Work Top Performance Requirements - Molded Epoxy Resin (Kemresin and EarthResin):
1. Physical Properties:

Flexural Strength (A.S.T.M. Method D790-90) =	15,000 PSI
Compressive Strength (A.S.T.M. MethodD695-90) =	30,000 PSI
Hardness, Rockwell E (A.S.T.M. Method D785-89) =	100
Water Absorption (A.S.T.M. Method D570-81)% by weight, 24 Hours =	0.04
% by weight, 7 Days =	0.05
% by weight, 2 Hour Boil =	0.04
Specific Gravity =	1.97
Tensile Strength =	8,500 PSI
Burn Characteristics =	Class 0, A
Thermal Expansion	34 10-6
Fire Resistance =	Self Extinguishing
Heat Deflection =	Should not be exposed to dry ice or liquid nitorgen

2. Performance Test Results (Heat Resistance):
A high form porcelain crucible, size 0, 15 ml capacity, shall be heated over a Bunsen burner until the crucible bottom attains an incipient red heat. Immediately, the hot crucible shall be transferred to the top surface and allowed to cool to room temperature. Upon removal of the cooled crucible, there shall be no blisters, cracks or any breakdown of the top surface whatsoever.

3. Performance Test Results (Chemical Resistance):
Tops shall resist chemical attacks from normally used laboratory reagents. Weight change of top samples submerged in the reagents* listed in the next paragraph for a period of seven (7) days shall be less than one-tenth of one percent, except that the weight change for those reagents marked with ** shall be less than one percent. (Tests shall be performed in accordance with A.S.T.M. Method D543-67 at 77o F.).
*Where concentrations are indicated, percentages are by weight.

Acetic Acid, Glacial	Iso-Octane
Acetic Acid, 5%	Kerosene
Acetone	Methyl Alcohol
Ammonium Hydroxide, 28%	Mineral Oil
Ammonium Hydroxide, 10%	Methyl Ethyl Ketone
Aniline Oil	Nitric Acid, 70%**
Benzene	Nitric Acid, 40%
Carbon Tetrachloride	Nitric Acid, 10%
Chromic Acid, 40%**	Oleic Acid
Citric Acid, 10%	Olive Oil
Cottonseed Oil	Phenol, 5%
Dichromate Cleaning Solution**	Soap Solution, 1%
Diethyl Ether	Sodium Carbonate, 20%

Dimethyl Formamide	Sodium Carbonate, 2%
Distilled Water	Sodium Chloride, 10%
Detergent Solution, 1/4%	Sodium Hydroxide, 50%
Ethyl Acetate	Sodium Hydroxide, 10%
Ethyl Alcohol, 95%	Sodium Hydroxide, 1%
Ethyl Alcohol, 50%	Sodium Hypochlorite,5%
Ethylene Dichloride	Sulfuric Acid, 85%
Heptane	Sulfuric Acid, 30%
Hydrochloric Acid, 37%	Sulfuric Acid, 3%
Hydrochloric Acid, 10%	Toluene
Hydrogen Peroxide, 28%	Transformer Oil
Hydrogen Peroxide, 3%	Turpentine

NOTE: Dichromate cleaning solution is a formula from Lange's Handbook of Chemistry.

4. Performance Test Results (Chemical Spot Tests - 24 Hours):
Chemical spot tests shall be made by applying 10 drops (approximately 1/2 cc) of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/2" diameter watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" or larger ball of cotton shall be saturated with the solvent and placed on the surfaces to be tested. The cotton ball shall then be covered by 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 24-hour test period and at a temperature of 77 degrees F. + 3 degrees F. At the end of the test period, the reagents shall be flushed from the surfaces 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. Spots where dyes have dried shall be cleaned with a cotton swab soaked in alcohol to remove the surface dye. The test panel shall then be evaluated immediately after drying.

Rating Description

0 = No detectable change

1 = Slight change in color or gloss

2 = Slight surface etching or severe staining

3 = Pitting, cratering, swelling, or erosion of coating.
Obvious and significant deterioration.

Chemical Reagent	Rating
Amyl Acetate	1
Ethyl Acetate	0
Acetic Acid, 98%	0
Acetone	1
Acid Dichromate, 5%	2
Butyl Alcohol	0
Ethyl Alcohol	0
Methyl Alcohol	0
Aluminum Hydroxide, 28%	0
Benzene	0
Carbon Tetrachloride	0
Chloroform	1
Chromic Acid, 60%	2

Cresol	1
Dichlor Acetic Acid	1
Dimethylformanide	1
Dioxane	1
Ethyl Ether	1
Formaldehyde, 37%	0
Formic Acid, 90%	1
Furfural	1
Gasoline	0
Hydrochloric Acid, 37%	1
Hydrofluoric Acid, 48%	2
Hydrogen Peroxide, 3%	0
Tincture of Iodine	0
Methyl Ethyl Ketone	1
Methylene Chloride	1
Mono Chlorobenzene	0
Naphthalene	0
Nitric Acid, 20%	0
Nitric Acid, 30%	0
Nitric Acid, 70%	1
Phenol, 90%	1
Phosphoric Acid, 85%	0
Silver Nitrate, Saturated	0
Sodium Hydroxide, 10%	0
Sodium Hydroxide, 20%	0
Sodium Hydroxide, 40%	0
Sodium Hydroxide, Flake	0
Sodium Sulfide, Saturated	0
Sulfuric Acid, 33%	0
Sulfuric Acid, 77%	0
Sulfuric Acid, 96%	0
Sulfuric Acid, 77% & Nitric Acid, 70%, Equal Parts	1
Toluene	0
Trichloroethylene	0
Xylene	0
Zinc Chloride, Saturated	0

PART 3 – INSTALLATION

3.01 INSTALLATION

A. Tops are to be installed only after base cabinets or support systems have been installed, leveled and secured. Tops are to be adhered to cabinets using screws, silicone or 2 part epoxy adhesive-choice dependent upon application. Counter tops are to be installed to achieve a uniform alignment at the front edge of the tops. Overhang of counter top edges are to be consistent and as indicated on approved shop drawings.
B. Shim tops as necessary to produce level joints and seams but no more than 1/8". Joint width is to be consistent through the length of each joint with no gap greater than 1/8". Use 2 part joint epoxy cement mixed per manufacturers recommendations. Prior to setting up, clean and remove excess joint adhesive from counter top and from above joint line. Finished joints should be clean and level with adjacent counter tops. Dips and bumps in joints are not acceptable. Installed tops should be free of uneven surfaces, waves or warping.
C. Installed counter tops are to be protected using heavy gauge paper or cardboard. Each top is to be affixed with a sign warning other trades that finished tops reside below.
D. Manufacturers' protective oil is to remain on countertops after installation and under protective paper and only to be cleaned off by others prior to owner acceptance and move in.

3.02 SINK INSTALLATION

A. The installer responsible for the installation of sinks shall follow good plumbing practice.
B. Sinks to be installed following manufacturer's best recommended practices.

3.03 PLUMBING FIXTURE INSTALLATION

A. The installer responsible for the installation of laboratory service fittings shall follow good plumbing practice.
B. Prior to fixture final connection, plumber to flush supply lines to remove pipe shavings, scale and other debris to eliminate foreign matter from damaging valve components and interfering with the proper operation of fittings.
C. Fittings to be secured to counter tops using manufacturer supplied locknut and lock washer. Do not over tighten.
D. Fixtures are to be installed without scratching the surface finish of faucets, valves or counter tops.

3.04 INSTALLER QUALIFICATIONS

A. Qualified installers shall have 10+ years and $50 million of installed product.
B. Installers shall be directly trained by the epoxy top manufacturer and certified to install epoxy tops to manufacturers recommended practices and tolerances.

3.05 CLEANING

A. Tops are to be cleaned using manufacturers recommended practices;
B. Clean Kemresin surfaces using a general purpose detergent and warm water.
C. Apply a coat of linseed oil or furniture polish after cleaning to maintain the top and to hide minor scratches.
D. Regular applications of linseed oil or furniture polish will enhance the appearance of your work top.