

SECTION 12345 –LABORATORY CASEWORK AND RELATED PRODUCTS

PART 2 – PRODUCTS

2.04 WORKSURFACES

A. MATERIALS

1. 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 and curbs shall be non-glaring. 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"

2. 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 and curbs shall be non-glaring. 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"

3. Plastic Laminate Tops:

Plastic laminate tops and back-splash shall be built up to a 1/16" 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 self-edge banded unless otherwise specified. All particle board edges and underside of top shall be sealed.

4. 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, and suitable wood inserts shall be provided on all four edges of underside of top to facilitate anchoring to base units. Splash rails and curbs 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 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 given a strippable plastic coating to protect the tops during shipment and installation. Underside of tops and sinks shall be coated with a plastic sound deadener.

5. **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.
6. **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.

B. WORK TOP PERFORMANCE REQUIREMENTS:

1. **Molded Epoxy Resin (Kemresin and EarthResin):**

a. **Physical Properties:**

| | |
|---|------------|
| Flexural Strength (A.S.T.M. Method D790-90) = | 15,000 PSI |
| Compressive Strength (A.S.T.M. Method D695-90) = | 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 |

b. **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.

c. **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.

d. 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.

Ratings:

A = No effect or slight change in gloss.

B = Slight change in color or marked loss of gloss.

C = Slight surface etching or severe staining.

D = Swelling, pitting, or severe etching.

| Reagents* | Rating |
|---------------------------------|--------|
| Acetic Acid, 98% | A |
| Acetone** | A |
| Ammonium Hydroxide, 28% | A |
| Carbon Tetrachloride** | A |
| Chloroform** | A |
| Chromic Acid, 60% | C |
| Chromic Acid, 40% | C |
| Dichromate Cleaning Solution*** | C |
| Dimethyl Formamide | A |
| Ethyl Acetate** | A |
| Ethyl Alcohol** | A |
| Formaldehyde, 37% | A |
| Formic Acid, 90% | A |
| Hydrochloric Acid, 37% | A |
| Hydrofluoric Acid, 48% | C |
| Hydrogen Peroxide, 28% | A |
| Methanol** | A |
| Methylethyl Ketone** | A |
| Nitric Acid, 70% | B |
| Phenol, 85% | A |
| Phosphoric Acid, 85% | A |

| | |
|-------------------------|---|
| Sodium Carbonate, 20% | A |
| Sodium Hydroxide, 40% | A |
| Sodium Hydroxide, 10% | A |
| Sodium Hypochlorite, 5% | A |
| Sulfuric Acid, 96% | D |
| Sulfuric Acid, 85% | A |
| Toluene** | A |
| Wrights Blood Stain | A |
| Xylene** | A |

* Where concentrations are indicated, percentages are by weight.

** Indicates these solvents tested with cotton and jar method.

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