

# Scientific Equipment & Furniture Association Recommended Practices

## **SEFA 3 - 2010 Laboratory Work Surfaces**



**SEFA World Headquarters  
65 Hilton Avenue  
Garden City, NY 11530**

**Tel: 516-294-5424  
Fax: 516-294-2758  
[www.sefalabs.com](http://www.sefalabs.com)**



## Table of Contents

	Page		Page
<b>Committee Members</b>	<b>118</b>	<b>5.0 General Description of Commonly Used Laboratory Work Surfaces &amp; Sink Materials</b>	<b>123</b>
<b>Foreword</b>	<b>119</b>		
<b>SECTIONS</b>			
<b>1.0 Scope and Purpose</b>	<b>120</b>	<b>5.1 Edge Grain Hardwood</b>	
<b>2.0 Performance Criteria</b>	<b>120</b>	<b>5.2 Epoxy Resin</b>	
<b>2.1 Chemical/Stain Resistance</b>		<b>5.3 Fiber-Cement</b>	
<b>2.2 Abrasion and Scratch Resistance</b>		<b>5.4 High Pressure Plastic</b>	
<b>2.3 Ease of Cleaning</b>		<b>5.5 Impregnated Natural Sand Stone</b>	
<b>2.4 Appearance</b>		<b>5.6 Polyolefin Sinks</b>	
<b>2.5 Heat/Cold Resistance and Thermal Shock</b>		<b>5.7 Solid Phenolic Composite</b>	
<b>2.6 Flammability/Flame Spread</b>		<b>5.8 Solid Surface</b>	
<b>2.7 Impact Resistance</b>		<b>5.9 Stainless Steel</b>	
<b>2.8 Load Bearing Capability</b>		<b>5.10 Wood Fiber and Thermo Set Composite</b>	
<b>2.9 Bacterial Resistance</b>		<b>6.0 Protection, Care and Maintenance of Work Surfaces and Sinks</b>	<b>124</b>
<b>2.10 Water Absorption</b>		<b>6.1 Protect surfaces and sinks</b>	
<b>3.0 Design Guidelines for Fabricated Work Surfaces and Sinks</b>	<b>122</b>	<b>6.2 Care and Maintenance of Laboratory Work Surfaces and Sinks</b>	
<b>3.1 Fabricated Work Surfaces Guidelines for Tolerance (prior to installation)</b>		<b>6.3 Reagents</b>	
<b>3.2 Sinks, Cupsinks and Special Use Sinks for Laboratories</b>		<b>6.4 Removal of stains</b>	
<b>4.0 Storage, Handling and Installation Guidelines</b>	<b>123</b>	<b>6.5 Extreme Temperatures</b>	
		<b>7.0 References</b>	<b>124</b>

## **SEFA 3—Laboratory Work Surfaces Committee Members**

### **Co-Chairs**

**Valerie Ross - Trespa, N.A.  
Frank Conner, TFI Inline Design**

**Dalton Corporation**

**Durcon, Incorporated**

**Eagle MHC**

**Kewaunee Scientific Corp.**

**Scientific Plastics**

**Trespa, BV**

# Foreword

## SEFA Profile

The Scientific Equipment and Furniture Association (SEFA) is an international trade association comprised of manufacturers of laboratory furniture, casework, fume hoods and members of the design and installation professions. The Association was founded to promote this rapidly expanding industry and improve the quality, safety and timely completion of laboratory facilities in accordance with customer requirements.

## SEFA Recommended Practices

SEFA and its committees are active in the development and promotion of Recommended Practices having domestic and international applications. Recommended Practices are developed by the association taking into account the work of other standard-writing organizations. Liaison is also maintained with government agencies in the development of their specifications.

SEFA's Recommended Practices are developed in and for the public interest. These practices are designed to promote a better understanding between designers, architects, manufacturers, purchasers, and end-users and to assist the purchaser in selecting and specifying the proper product to meet the user's particular needs. SEFA's Recommended Practices are periodically updated. The Recommended Practices are numbered to include an annual suffix which reflects the year that they were updated. SEFA encourages architects to specify these Recommended Practices as follows: "SEFA 3-2010".

## SEFA Glossary of Terms

SEFA has developed a Glossary of Terms (SEFA 4-2010) for the purpose of promoting a greater understanding between designers, architects, manufacturers, purchasers and end users. The terms defined by SEFA are frequently used in contracts and other documents, which attempt to define the products to be furnished or the work involved. The Association has approved this Glossary in an effort to provide uniformity among those who use these terms. Where a specific Recommended Practice contains definitions which differ from those in the Glossary of Terms, then the definitions in the specific Recommended Practice should be used.

SEFA encourages all interested parties to submit additional terms or to suggest any changes to those terms already defined by the Association. The definitions should be used to help resolve any disputes that may arise or to incorporate the applicable terms in any contract or related documents.

## SEFA Disclaimer

SEFA uses its best effort to promulgate Recommended Practices for the benefit of the public in light of available information and accepted industry practices. SEFA does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with SEFA Recommended Practices or that any tests conducted under its Recommended Practices will be non-hazardous or free from risk. SEFA encourages the use of third party independent testing where appropriate.

**Note :** *Testing as described in this document must be performed and documented by a SEFA-approved third party testing facility. See Page 34 of the SEFA Desk Reference 5th Edition Version 2.0, or visit us at SEFALABS.COM for the most current list of SEFA-approved test labs.*

## 1.0 Scope and Purpose

SEFA guidelines are intended to provide manufacturers, specifiers and users with specific information helpful in their evaluation of the safety, durability and structural integrity of laboratory casework and complementary items. While SEFA attempts to provide professionally appropriate information to manufacturers, specifiers and users, it is the sole responsibility of manufacturers, specifiers and users to determine the appropriateness of the information and interpretations of it for their use in determining which products and guidelines are appropriate for their intended uses. The scope of SEFA 3 is limited to work surfaces and sinks. Although SEFA attempts to be inclusive of all generic products normally used in laboratories and welcomes information about such products for inclusion in SEFA 3, SEFA does not represent that every potential product is included. The products included in this version of SEFA 3 are the following: for work surfaces—Edge Grain Hardwood, Epoxy Resin, Fiber Cement, High Pressure Laminate, Impregnated Natural Stone, Solid Phenolic Composite, Solid Surface, Stainless Steel, Welded Fiber and for sinks— Epoxy Resin, Polyolefin, Solid Surface and Stainless Steel.

## 2.0 Performance Criteria Often Appropriate in the Selection of Work Surfaces and Sinks (included are specific test procedures which may be considered to assess these characteristics)

Depending on the user's needs, the following product performance criteria may be appropriate in the user's selection process along with supplier information and reputation, cost and other aspects important to users. SEFA's intent is to stimulate users to consider and define their needs and to encourage suppliers to provide information on commonly used tests in the laboratory industry to evaluate performance characteristics the user deems appropriate for its specific use. Once user needs are defined, appropriate information may be requested from suppliers. Other criteria may also be appropriate to a given laboratory user and such information should be requested of

suppliers when needed. Common tests are stated for screening work surface and sink products dependent upon the users needs (criteria which is important to the user in their particular lab environment). In addition to requesting test results from suppliers appropriate to the user's needs, users should understand the validity and reliability of the test method and data and whether such data is merely "representative" or "certified" and what, if any warranty is given by the supplier.

## 2.1 Chemical/Stain Resistance

Users should consider the chemical and staining agents that might be used on or near the laboratory work surface or sink. Common guidelines can be found by referring to: The work surface manufacturer printed data for chemical and stain resistance, NEMA LD3-2000 for wood product chemical resistance, ASTM D3023 and ASTM C1378 for stain resistance or the most current versions. Because chemical and stain resistance is affected by concentration, time, temperature, humidity, housekeeping and other factors, it is recommended that users test samples in their actual environment with the substances they use.

### 2.1.1 Chemical/Stain Resistance Test

The purpose of the chemical stain resistance test is to evaluate the resistance a finish has to chemical spills.

**Test Method A** – For volatile chemicals – A cotton ball, saturated with the test chemical, was placed in a one ounce bottle (10mm x 7mm test tube or similar container). The container was inverted on the test material surface for a period of 24 hours. Temperature of test: 23° +/- 2°C (73° +/- 4°F). This method was used for the organic solvents.

**Test Method B** – For non-volatile chemicals – Five drops (1/4cc) of the test chemical were placed on the test material surface. The chemical was covered with a watch glass (25mm) for a period of 24 hours. Temperature of test: 23° +/- 2°C (73° +/- 4°F). This method was used for all chemicals listed below other than solvents.

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid, 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol, Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichloroacetic Acid	A
16.	Dimethylformamide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrofluoric Acid, 37%	B
24.	Hydrofluoric Acid, 48%	B
25.	Hydrogen Peroxide, 30%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Monochlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B
32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B
38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide Flake	B
41.	Sodium Sulfide Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid 96%	B
45.	Sulfuric Acid, 77% & Nitric Acid, 70% equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

## 2.1.2 Acceptance Level

After 24-hours exposure, exposed areas were washed with water, then a detergent solution and finally with isopropyl alcohol. Materials were then rinsed with distilled water and dried with a cloth. Samples are numerically rated as follows:

**0 – No Effect – No detectable change in the material surface.**

**1 – Excellent – Slight detectable change in color or gloss but no change in function or life of the surface.**

**2 – Good – A clearly discernible change in color or gloss but no significant impairment of surface life or function.**

**3 – Fair – Objectionable change in appearance due to discoloration or etch, possibly resulting in deterioration of function over an extended period of time.**

Results will vary from manufacturer to manufacturer due to differences in composition and finish formulations and applications processes. Laboratory Grade work surface finishes shall result in no more than 4 Level 3 conditions. Individual test results for the specified 49 reagents will be verified with an established third party independent SEFA 3 test submittal form. Suitability for a given application is dependent upon the chemicals used in a given laboratory.

## 2.2 Abrasion and Scratch Resistance

Users should consider the likelihood of uses causing abrasion, wear or scratches to the work surface or sink. Common guidelines are found in ASTM C501, NEMA LD3-3.13-2000 and NEMA LD3.7-2000 or the most current versions.

## 2.3 Ease of Cleaning

While a regular schedule of maintenance and housekeeping is always recommended including cleaning up spills immediately, some laboratories, e.g., those working with pathogens and radioactive isotopes, may be required to select non-porous materials and smooth surfaces for their lab work surfaces. Common guidelines

include ASTM D4488, ASTM G122 and NEMA LD3-3.4-2000.

## 2.4 Appearance

Users should consider the importance of initial and long-term appearance on work surfaces and sinks. Housekeeping practices are also critical to maintaining appearance. Users should also consider whether the color of the work surface or sink is important and when it is, consult the work surface manufacturer for color availability. Sometimes performance characteristics are influenced by color so users should seek supplier's advice when selecting colors. Common guideline is ASTM F1037.

## 2.5 Heat/Cold Resistance and Thermal Shock

Users should ascertain the range of temperatures to which the work surface and sink may be exposed as well as the duration of the exposure at temperatures within the range. Also, if rapid changes in temperature may be encountered, e.g., dry ice in the sink, thermal shock should be considered. In addition, heat may cause blisters, cracks and breakdowns in the surface. Consult the work surface manufacturer for Hot Crucible and Bunsen Burner information. Commonly used guidelines for Heat Distortion are ASTM D648, ASTM C484 and Thermal Coefficient of Expansion ASTM D696.

## 2.6 Flammability/Flame Spread

Users should ascertain whether sources of flame may be encountered or if there are code requirements for the intended use. Common guidelines are ASTM E84, D3713, D5048, D3801, D635, UL 723 and NFPA 225.

## 2.7 Impact Resistance

Users should consider the likelihood and nature of objects impacting the work surface and sinks. Common guidelines are ASTM D256, D4508, D5420, D628, E1321 and Rockwell M hardness ASTM D785.

## 2.8 Load Bearing Capability

Users should consider the maximum loads that the work surface and sink will have to bear. The extent of support underneath the work surface and sink should also be included in the assessment. Common guidelines are: Compressive Strength ASTM D695 (the measure of resistance to a crushing force), Flexural Strength ASTM D790 (resistance to bending stresses), Tensile Strength ASTM D638 (amount of pull required to break a sample of material).

## 2.9 Bacteria Resistance

Users should consider the importance in their use of the work surface's and sink's ability to resist, support or promote bacterial growth and to be decontaminated or disinfected. Common guidelines are ASTM E1428, ASTM G-22 ANSI Z124.6, and NSF51.

## 2.10 Water Absorption

Users should consider the effects of moisture on work surfaces and sinks. A common guideline is ASTM D570.

## 3.0 Fabricated Work Surfaces and Sinks

### 3.1 Fabricated Work Surfaces Tolerance (prior to installation)

Guidelines prior to installation shall be in accordance with fabricator's standards.

Color, Texture, Finish, Edge Detail and Drip Groove: See individual manufacturer's guidelines for a detailed description. It is further suggested that before specifying any material, samples be obtained and approved.

### 3.2 Sinks, Cupsinks and Special Use Sinks for Laboratories

**3.2.1** It is recommended that all sinks for laboratory use shall be provided with a drain



outlet measuring no less than 1-1/2" diameter. Drain fittings shall conform to ANSI 124.6 sec 4.1.1 connection test.

**3.2.2** Laboratory sinks shall be fabricated to have an internal basin fall of no less than one degree to allow for proper draining.

**3.2.3** The laboratory sinks shall have a load bearing capacity of 1-1/2 times the maximum volume of water weight that the sink can hold. A gallon of water is 231 cubic inches and is 8.3 pounds.

**3.2.4** Sinks shall be provided with a plug and strainer, overflow that is either integral with inlet located two inches below the top of the sink and back flow preventer, or with a standpipe overflow terminating two inches below the top of the sink (Exclude cupsinks, people ask for stoppers and a cupsink is a disposal sink)

**3.2.5** Sink support and mounting shall be per manufacturer's recommendations.

**3.2.6** ADA requirements: Refer to ADA section of recommended practice.

## **4.0 Recommended Storage, Handling and Installation Guidelines**

Refer to Current SEFA 2 Installation Recommended Practices.

## **5.0 General Description of Commonly Used Laboratory Work Surface and Sink Materials**

### **5.1 Edge Grain Hardwood**

Multiple strips of solid edge grain hardwood glued together which can be finished in penetrating oil or clear synthetic finish.

### **5.2 Epoxy Resin**

Epoxy resin tops and sinks are produced from a composite of epoxy resin, silica, inert fillers and

organic hardeners. Material is cast and cured in ovens at elevated temperatures. Material is homogeneous throughout and non-absorbent.

### **5.3 Fiber-Cement**

Fiber-cement tops are integrally pigmented fiber cement sheets formed by utilizing either the filter press or Hatchcheck process. Material is steam cured in an autoclave oven in order to accelerate the curing cycle of cement.

### **5.4 High Pressure Plastic Laminate**

High pressure plastic laminate tops are made from melamine-impregnated surface papers pressed over phenolic-impregnated kraft paper layers. The back is sanded to facilitate bonding to the top of suitable substrate.

### **5.5 Impregnated Natural Sand Stone**

Impregnated natural sand stone tops are produced from stone, free of veins or seams and impregnated with a resin with additional surface coatings baked at a high temperature to polymerize the resins and harden the stone.

### **5.6 Polyolefin Sinks**

Sinks formed from a class or group name for thermoplastic polymers, derived from simple olefins, most predominant are polyethylene and polypropylene for laboratory use.

### **5.7 Solid Phenolic Composite**

Solid phenolic composite tops are a compression molded composite of a homogeneous core of organic fiber reinforced phenolic and may contain one or more integrally cured surfaces that are non-porous.

### **5.8 Solid Surface**

Solid surface tops and sinks are produced from a composite of natural minerals, acrylic and/or polyester resin, or epoxy resin, free from internal strengthening fibers, and pigment. The resulting product is homogenous throughout, renewable, and non-porous. Where appropriate, solid surface

may feature inconspicuous seams of similar composition.

## 5.9 Stainless Steel

Stainless steel tops and sinks are usually fabricated from 14 to 18-gauge type 304 or 316 series stainless steel. Surfaces are integrally formed with all seams fully welded with stainless steel fillers, ground smooth, and blended to a #4 mill finish (solder or compounded fillers not acceptable).

## 5.10 Wood Fiber & Thermo Set Composite

Wood fiber and thermo set composite tops are made of processed wood fiber substrate surrounded by a layer of reinforced thermo set resin and an acid resistant outer coating.

## 6.0 Protection, Care and Maintenance of Work Surfaces and Sinks

### 6.1 Protect surfaces and sinks prior to and during installation.

Never allow tradesman to walk on them or use them as a workbench or scaffolding, etc. Supplier is not responsible for damage to surfaces or sinks from tradesmen after installation and before acceptance.

### 6.2 Care and Maintenance of Laboratory Work Surfaces and Sinks

A regular schedule of cleaning and maintenance is the most effective means to prolong the surface life and attractiveness of all laboratory work surfaces and sinks for many years. Consult the supplier for suggested cleaning methods.

### 6.3 Reagents

Do not allow reagents to remain in contact with the working surface or sink longer than necessary. Clean up spills immediately

## 6.4 Removal of stains

End users should consult the supplier for recommendations.

## 6.5 Extreme Temperatures

Avoid exposing work surface or sink to extreme temperatures or extreme changes in temperature.

See manufacturer's recommendations for acceptable hot and cold temperature

## 7.0 References

### ANSI- American National Standards Institute

1819 L Street, NW  
Washington, DC 20036  
[www.ansi.org](http://www.ansi.org)

### ASTM-American Society for Testing & Materials

100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959  
[www.astm.org](http://www.astm.org)

### NEMA- National Electrical Manufacturers Assoc.

1300 North 17th Street, Suite 1752  
Rosslyn, VA 22209  
[www.nema.org](http://www.nema.org)

### NFPA- National Fire Protection Association

1 Batterymarch Park  
Quincy, MA 02169-7471  
[www.nfpa.org](http://www.nfpa.org)

### U.L.- Underwriters Laboratories

333 Pfingsten Road  
Northbrook, IL 60062-2096  
[www.ul.com](http://www.ul.com)

### NSF- NSF

769 N. Dixboro Road  
Ann Arbor, MI 48105-9723  
[www.nsf.org](http://www.nsf.org)