State of Rhode Island
Department of Administration / Division of Purchases
One Capitol Hill, Providence, Rhode Island 02908-5855
Tel: (401) 574-8100 Fax: (401) 574-8387

ADDENDUM # 7

1/21/2016

Solicitation #7550080

Title: Community College of Rhode Island Knight Campus Chemistry & Biology Departments Renovations.

Submission Deadline: Note Change

From: January 26, 2016 @ 10:00 AM

To: February 2, 2016 @ 10:30 AM

Per the issuance of <u>ADDENDUM #7</u> the following are noted:

Addendun #7 (See Attached)

Interested Parties should monitor this website on a regular basis, for any additional information that may be posted.

Gary P. Mosca
Senior Buyer

SECTION 00 9111
ADDENDUM 7

PART 1 - GENERAL

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated **November 6th, 2015**. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.

This Addendum consists of **1** page and the following documents:

A. Biology – Specification Section 11612 – Fume Hoods
B. Biology – Specification Section 12300 – Plastic Laminate Casework
C. Biology – Specification Section 12366 – Epoxy Resin Countertops

1.01 CHANGES TO PROJECT MANUAL

A. Biology – Delete section 11612, dated November 6th, 2015. Replace with Section 11612, Fume Hoods, dated January 19th, 2016, attached.
B. Biology – Delete section 12300, dated November 6th, 2015. Replace with Section 12300, Plastic Laminate Casework, dated January 19th, 2016, attached.
C. Biology – Delete section 12366, dated November 6th, 2015. Replace with Section 12366, Epoxy Resin Countertops, dated January 19th, 2016, attached.

1.02 CHANGES TO DRAWINGS

A. N/A

1.03 QUESTIONS AND ANSWERS

A. N/A

1.04 ADDITIONAL INFORMATION

A. N/A

1.05 SUBSTITUTION REQUESTS

A. N/A

END OF SECTION

FUME HOODS
Section 11612

SECTION INCLUDES HAMILTON SCIENTIFIC:
1. **LabFitOut FUME HOOD**
2. **SINKS, DRAINS, AND TRAPS**
3. **LABORATORY FITTINGS**
4. **ACCESSORY EQUIPMENT**

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: Fume hoods

1.02 FUME HOOD GENERAL DESIGN REQUIREMENTS

A. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.

B. Design fume hoods for consistent and safe air flow through the hood face. Negative variations of face velocity shall not exceed 20% of the average face velocity at any designated measuring point as defined in this section.

C. Average illumination of work area with Polyresin liner: Minimum 80 footcandles. Work area shall be defined as the area inside the superstructure from side-to-side, from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.

D. Fume hood shall be designed to minimize static pressure loss, with adequate slot area and bell shaped exhaust collar configuration. Maximum average static pressure loss readings, taken three diameters above the hood outlet from four points 90 degrees apart, shall not exceed the following maximums with sash in ***full*** open position:

Face Velocity Measured S.P.L. (W.G.)
60 F.P.M. .15 inches
100 F.P.M. .30 inches

E. Fume hood shall maintain essentially constant exhaust volume at any sash position for safety. Maximum variation in exhaust CFM and static pressure as a result of sash adjustment shall not exceed 5% for any sash position at the specified exhaust volume. Restricted bypass versions of the LabFitOut Fume Hood are available for use with combination and horizontal sashes, and for use with variable air volume fume hood controls (mfg by others). See 2.04 and 2.05 of this specification for more details of Bypass & Restricted Bypass designs.

F. Noise Criteria: Test data of octave band analysis verifying hood is capable of a 50 NC value when connected to a 50 NC HVAC source. Reading shall be taken 3' in front of an open sash, 5' off the floor at 100 fpm face velocity.

G. Interior and exterior materials of construction and finishes shall meet the usage and specification requirements.

1.03 LINER SURFACE FINISH PERFORMANCE REQUIREMENTS

A. Test procedure:

1. Test No. 1 – Spills and Splashes:
   a. Suspend in a vertical plane: a 42" (horizontal) by 12" (vertical) panel divided into 3/4" wide vertical columns, each column numbered 1 through 49.
   b. Apply five drops of each reagent listed with an eyedropper.
   c. Apply liquid reagents at top of panel and allow to flow down full panel height. (CAUTION! Flush away any reagent drops.)

2. Test No. 2 – Fumes and Gases:
   a. Divide 24" x 12" panel into 2" squares, each square numbered 1 through 49.
   b. Place 25 milliliters of reagent into 100 milliliter beakers and position panel over beaker tops in the proper sequence. Note: Beaker pouring lip permits atmospheric oxygen to enter and participate in the reaction of the reagent fumes.
3. After 24 hours remove panel, flush with water, clean with naphtha and detergent, rinse, wipe dry and evaluate.

B. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:

1. No Effect: Any detectable change in surface material.
2. Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.

3. Good: Clearly discernible change in color or gloss, but no significant impairment of work surface function or life.
4. Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
5. Failure: Pitting, cratering or erosion of work surface material; obvious and significant deterioration.

C. Test Results: "P" Fume Hood Liner

REAGENT LIST **Concentrations by Weight**	Test No.1 **Rating Spills**	Test No. 2 **Fumes**
1. Sodium Hydroxide Flake	---	No Effect
2. Sodium Hydroxide, 40%	Excellent	No Effect
3. Sodium Hydroxide, 20%	Excellent	No Effect
4. Sodium Hydroxide, 10%	Excellent	No Effect
5. Ammonium Hydroxide, 28%	No Effect	No Effect
6. Eldorado—Plus (Solution)	No Effect	No Effect
7. Chloroform	Excellent	No Effect
8. LpH SE (Solution)	No Effect	No Effect
9. Trichloroethylene	Excellent	No Effect

10.	Monochlorobenzene	Excellent	No Effect
11.	Tincture of Iodine	Excellent	Excellent
12.	Methyl Alcohol	No Effect	No Effect
13.	Ethyl Alcohol	No Effect	No Effect
14.	Butyl Alcohol	No Effect	No Effect
15.	Phenol, 85%	Excellent	No Effect
16.	Cresol	Excellent	No Effect
17.	Sodium Sulfide, Saturated	Good	No Effect
18.	Furfural	Fair	No Effect
19.	Dioxane	No Effect	No Effect
20.	Zinc Chloride, Saturated	No Effect	No Effect
21.	Benzene	Excellent	No Effect
22.	Toluene	Excellent	No Effect
23.	Xylene	Excellent	No Effect
24.	Gasoline	Excellent	No Effect
25.	Naphthalene	Excellent	No Effect
26.	Methyl Ethyl Ketone	Excellent	No Effect
27.	Acetone	Excellent	No Effect
28.	Ethyl Acetate	Excellent	No Effect
29.	Amyl Acetate	Excellent	No Effect
30.	Ethyl Ether	Excellent	No Effect
31.	Silver Nitrate, 10%	Good	No Effect

REAGENT LIST – *continued*		Test No.1	Test No. 2
Concentrations by Weight		**Rating Spills**	**Fumes**
32.	Di Methyl Formamide	No Effect	Excellent
33.	Formaldehyde, 37%	No Effect	No Effect
34.	Formic Acid, 88%	No Effect	No Effect
35.	Acetic Acid, Glacial	No Effect	No Effect
36.	Dichloro Acetic Acid, 93%	Excellent	Excellent
37.	Chromic Acid, Saturated	Good	No Effect
38.	Phosphoric Acid, 85%	No Effect	No Effect
39.	Sulfuric Acid, 33%	No Effect	No Effect
40.	Sulfuric Acid, 77%	Excellent	No Effect
41.	Sulfuric Acid, 93%	Good	No Effect
42.	Hydrogen Peroxide, 30%	No Effect	No Effect
43.	Acid Dichromate	Excellent	No Effect
44.	Nitric Acid, 20%	Excellent	No Effect
45.	Nitric Acid, 30%	Excellent	No Effect
46.	40 & 47 Equal Parts	Excellent	Good
47.	Nitric Acid, 70%	Excellent	Good
48.	Hydrochloric Acid, 37%	No Effect	Excellent
49.	Hydrofluoric Acid, 48%	No Effect	Failure

1.04 SUBMITTALS

A. Shop Drawings: Indicate equipment locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances and all required clearances.

B. Product Data: Submit manufacturer's data for each component and item of laboratory equipment specified. Include component dimensions, configurations, construction details, joint details and attachments, utility and service requirements and locations. Include liner and exterior finish tests by independent third party.

C. Samples: Submit [3 x 6] inch samples of finish for fume hood, work surfaces and for other pre-finished equipment and accessories for selection by [Architect] [Owner].

D. Test Reports: Submit test reports on **each** size and type of hood verifying conformance to test performances specified. Test report must accompany **each** hood as part of installation and usage package. Submit independent test reports as required by specification.

E. Instructions—Submit for review and approval:
   1. Instructions to be inscribed on instruction plate to be attached to hood, as specified in Part 2 of this Section.
   2. Written instructions in booklet form providing additional details on safe and proper operation and maintenance.
   3. Professional quality video—minimum 15 minutes in length on proper hood usage.

F. Independent validation: Written verification of compliance to UL-1805 fume hood standard is mandatory.

1.05 QUALITY ASSURANCE

A. Single source responsibility: Fume hood casework, plastic laminate casework, work surfaces, and other laboratory equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled employees to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:
   1. Five years or more experience in manufacture of laboratory casework and equipment of type specified.

   2. UL 1805 Specification: (Mandatory)
      Fume Hood must be Underwriters Laboratories subject 1805 classified. The 1805 standard covers electrical and mechanical hazards, investigates the flammability of materials, and measures the effectiveness of airflow characteristics. Proper labeling must be affixed to the face of each fume hood indicating classification to the UL 1805 standard for Fume Hoods. UL listing covering electrical components only or other listings that do not encompass all issues covered in UL 1805 is insufficient. All factory testing shall be performed in a U.L. certified test facility.
   3. The Concept hood complies with NFPA requirements as it pertains to materials used and construction, as well as the National Electrical Code. UL 1805 signifies that the wiring and electrical components used meet NEC, and that the materials used meet NFPA with a flame spread of less then 25.

C. Installer's qualifications: Factory certified by the manufacturer. Provide outline of certification program.

1.06 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard, completely covering the top and securely taped to edges. Mark cardboard in large lettering "No Standing".

1.07 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
   1. Windows and doors are installed and the building is secure and weather tight.
   2. Ceiling, overhead ductwork and lighting are installed.
   3. All painting is completed and floor tile located below casework is installed.

PART 2 – PRODUCTS

2.01 Supplier

LabFitOut
Wakefield Ma

Dealer: STEM Solutions LLC
Jim Broderick tel. 617-826-6111

2.02 FUME HOOD MATERIALS

A. Steel: High quality, cold-rolled mild steel, meeting requirements of ASTM A1008; gauges U.S. Standard and galvanized.

B. Not used

C. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.

D. Downdraft bypass: Low resistant type, 18 gauge steel chamber, directional louvers—not acceptable. All bypass air shall enter top of bypass chamber and enter hood in a down flow direction. Chamber shall protect user from expelled particulate in the event of an adverse internal reaction.

E. Safety glass: 7/32" thick laminated safety glass or 3/8" thick laminated safety glass viewing panel.**Cables are not acceptable.**

F. Sash chain: ANSI #35 steel, single strand. Average tensile strength of 2,400 pounds; maximum working load of 480 pounds.

G. Sash guides: Extruded PVC.

H. Pulley assembly for sash chain: Finish bored steel drive sprockets and keyed drive, 1/2" diameter front connector shaft. Rear idler sprockets; double sealed ball bearings, lubricated. All sprockets steel with zinc dichromate finish.

I. Sash pull: Corrosion resistant steel with chemical resistant powder coating. Maximum 1.5" thick.

J. Gaskets: White 70 durometer PVC for interior access panels. Gasket interior access panels to eliminate air leakage and to retain liquids inside hood.

K. Fastenings:
   1. Exterior structural members' attachments: Sheet metal screws, zinc plated.

2. Interior fastening devices concealed. Exposed screws not acceptable. (Screw head "caps" not acceptable.)
3. Exterior side access panel member fastening devices to be exposed corrosion resistant, non-metallic material, creating a positive mechanical latch. Latch must be flush type. Exposed screws or Velcro fasteners—not acceptable.

L. Instruction plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus, accessories, baffle settings and use of sash.

2.03 FUME HOOD CONSTRUCTION

A. Superstructure: Rigid, self-supporting assembly of double wall construction, maximum 4-7/8" thick.
1. Wall consists of a sheet steel outer shell with urethane powder finish and a corrosion resistant inner liner. This wall houses and conceals steel framing members, attaching brackets and remote operating service fixture mechanisms and services. Panels must be attached to a full frame construction, minimum 14 gauge galvanized members. Panels and brackets attached to eliminate screw heads and metallic bracket from hood interior. [Specified option] Exterior sidewalls and upper front panel to be plain-sliced Maple with either 304 stainless steel or powder coat steel front panels.
2. Access to fixture valves concealed in wall provided by exterior removable access panels, gasket access panels on the inside liner walls, or through removable front posts.

B. Exhaust outlet: Rectangular with ends radiused, shaped and flanged, 18 gauge steel finished with urethane powder coating.

C. Access opening perimeter: Airfoil or streamlined shape with all right angle corners radiused or angled. Bottom horizontal foil shall provide nominal one-inch bypass when sash is in the closed position. Bottom foil shall be removable without use of special tools. Bottom foil shall provide access area sufficient in size to pass thru hospital grade electrical plugs. Bottom foil: Steel with urethane powder coating to increase acid and abrasion resistance. Airfoil and sill to be low profile design. A secondary containment trough shall be located in front of the work surface and extend below the airfoil sill.

D2. Fume hood sash: (**Combination**) Vertical and horizontal sash access with a 35" high sight line. Sash shall be top hung on nylon tired stainless steel ball bearing wheels. Sash frame on bottom and sides must be no more than 1.5" thick and radiused to minimize turbulence. Area above the 28" vertical sash opening shall be glazed with a minimum of 3/8" thick laminated safety glass. All glass to have polished exposed edge treatment. Horizontal panels provided with finger pulls. Combination sash is available on restricted bypass hoods only.**All Hoods to be ADA Accessible.**

E. Counter balance system: Single weight, sprocket and chain, counter balance system which prevents sash tilting and permits ease of operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full 18" height of operating sash opening. Life cycle test sash and weight. Provide independent test data. (See 2.02 F, G and H for material descriptions.) Open and close sash against rubber bumper stops.

F. Airfoil: The airfoil will be low profile, relatively flush to the work surface with ample room for hospital grade electrical cords to fit beneath the airfoil. This sill to be used on both sash

types. Sill to be ergonomically radiused on front edge. Sill must pivot forward to provide cord and trough access. Airfoil sills that are not low profile are not acceptable.

G. Fume hood liner: Polyresin (product number denoted by the suffix "P"): Reinforced polyester panel; smooth finish and white color in final appearance. Flexural strength: 14,000 psi. Flame spread: 17 or less per U.L. 723 and ASTM E84-80. Baffle must be same material as liner. Metallic baffles, brackets or supports on hood interior—not acceptable. Liner and baffle material ***must*** meet 1.03 performance test. Independent test validation is mandatory.

H. Baffles: Baffles providing controlled air vectors into and through the fume hood must be fabricated of the same material as the liner. Provide minimal exhaust slots full height on vertical sides of the baffle. High performance two piece baffle will be used. Baffle shall incorporate exhaust slots located to purge the upper and lower area of the hood. Baffle to be non-adjustable. Baffles with manual or automatic adjustment are not acceptable. All baffles, supports, and brackets to be non-metallic.

I. Auto-Sash: Sash shall be designed to promote usage as an upper body and face shield. Face velocities and volumes shall be based on an 18" operating opening. Sash shall have the capability to be raised to full 28.5" vertical opening for loading or unloading of large apparatus. A lock-open shall be provided. Sash shall lower automatically to the operating position or lower when released from any position above 18". Auto-sash function shall be life cycle tested and not incorporate the need for motor drives. Submit third party validation of life cycle tests.

J. Service fixtures and fittings: Color-coded hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color-coded index handles.
   1. Valves: Needlepoint with self-centering cone tip and seat of hardened stainless steel. Tip and seat shall be replaceable.
   2. Provide piping for all service fixtures from valve to outlet: Galvanized iron or copper for water, air and vacuum; black iron for gas services.
   3. Fixtures exposed to hood interior: Brass with chemically resistant color-coded powder coating.
   4. Remote control handles: Four-arm handle with nylon color-coded index buttons.
   5. Services: As shown or specified.

K. Service fixtures and fittings:
   1. Service treatment: Fittings are to be coated with a chemically resistant polyester powder lacquer electrostatic ally applied and backed on for a uniform finish.
   2. Handle and outlet nozzle will be color coded to the media. Outlet nozzles shall be made of the same high quality brass as the valve bodies. Other materials may be in contact with media where appropriate.
   3. Provide piping for all service fixtures from valve to outlet: Galvanized iron or copper for water, air and vacuum; black iron for gas services.
   4. Fixtures shall incorporate quick connect compression fittings on the valve body (for the media inlet and media outlet) as well as the fume hood outlet nozzle. With this system ***no soldering or brazing should be required to complete mechanical connections.***
   5. Fixtures exposed to fume hood interior shall have a chemical resistant finish.
   6. Fixtures are to be provided with easy to mount attachment device for secure mounting in deck or wall mounted applications. System to be installed with simple hand tools.
   7. Fittings are to be constructed to operate with the following ***maximum working pressure*** without leak or failure.
      - Water Fittings: 145 PSI
      - Non-Burning Gas: 145 PSI
      - Burning Gases: 100 PSI

- Special Water Fittings: 145 PSI
- Oxygen Fittings: 145 PSI

8. All outlets shall have detachable, serrated nozzles.

L. Hood light fixture: Two lamp, rapid start, UL listed fluorescent light fixture with sound rated ballast installed on exterior of roof. Provide safety glass panel cemented and sealed to the hood roof.
1. Interior of fixture: White, high reflecting plastic enamel.
2. Size of fixture: Largest possible up to 48" for hoods with superstructures up to seven feet. Provide two 36" fixtures for hoods with eight-foot superstructures.
3. Include lamps with fixtures. Hoods without lamps are not acceptable.
4. Illumination: Per performance values, Part 1 of this Section.
5. Access to light thru lintel panel—no tools required.

M. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Flush plates: Black acid resistant thermoplastic.

N. Work surfaces: 1-1/4" thick surface, dished a nominal 3/8" to contain spills.
(Molded resin work surfaces for hoods with Polyresin liners.)

O. Paper Screen: Consists of cold rolled expanded metal and applied with Electro statically applied finish to prevent corrosion. The expanded metals are 18 gauge with spacing not to exceed 1-1/4".

P. Safety Monitor/Alarm System**Model #AFA 1000**
Where shown or specified, provide Safety Monitor/Alarm System, which monitors face velocity and provides audible and visual alarm if face velocity drops below safe levels. As the internal fume hood pressure changes while the sash is closed and opened, the flow passing over the thermistor is calibrated to a face velocity, which is displayed on the monitor front.
1. Safety monitor: UL listed, tamper proof, with all alarm circuits, electric components, external tubing, and manifolds furnished complete and factory installed.
2. ***Calibration is the responsibility of the owner*** and is required once the hood is stationed and the hood exhausts and room supply systems are balanced. A secondary calibration has been factory set into the alarm's memory only to determine that the alarm is functional and ready for shipment. ***The primary calibration must be completed in the field*.**
3. Airflow sensor: Thermally compensated glass-beaded thermistor, factory connected to a sidewall port on the interior of the fume hood.
4. Alarm Signal: Audible and visual signal.
   a. Silence pushbutton, which disables the audible alarm, shall be accessible on the front of the safety monitor.
   b. Provide alternate mode in which audible alarm is silenced indefinitely but visual alarm remains activated until the alarm condition is corrected.
   c. When alarm conditions are corrected and face velocity and volume return to specified levels, the Safety Monitor will automatically reset and begin routine monitoring.
5. Provide test circuit to verify proper Safety Monitor operation.

2.04 Not Used

2.05 BYPASS TYPE FUME HOODS

A. Constant volume with built-in automatic compensating bypass to maintain constant exhaust volume regardless of sash position.

B. Bypass: Positive in action and controlled by the sash operation.

C. Low resistance opening at top of front lintel panel. Bypass shall provide a smooth down flow effect.

D. As sash is lowered to 6", bypass design shall limit the increase in face velocity to maximum of three times the average face velocity with the sash full open.

E. Width: [48"].

2.06 METAL FINISH

A. Metal finish:
1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
2. Application: Electro statically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness:
   a. Exterior and interior exposed surfaces: 1.5 mil average and 1.2 mil min.
   b. Backs of cabinets and other surfaces not exposed to view: 1.2 mil average.
   Liquid, dipped, solvent based finishes are not and will not be acceptable!

B. Cabinet Surface Finish Tests:
All casework construction and performance characteristics shall be in full compliance with SEFA 8 standards. At the owner's request, independent, third party performance testing must be submitted validating compliance and adheres to the finish specifications.

1. Chemical Spot Test

1.1 Purpose of Test

The purpose of the chemical spot test is to evaluate the resistance a finish has to chemical spills.
Note: Many organic solvents are suspected carcinogens, toxic and/or flammable. Great care should be exercised to protect personnel and the environment from exposure to harmful levels of these materials.

1.2 Test Procedure

Obtain one sample panel measuring 14" x 24" (355.6mm x 609.6mm). The received sample to be tested for chemical resistance as described herein. Place panel on a flat surface, clean with soap and water and blot dry. Condition the panel for 48 hours at 73+ 3F (23(+ 2(C))and 50+ 5% relative humidity. Test the panel for chemical resistance using forty-nine different chemical reagents by one of the following methods:

Method A—Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce (29.574cc) bottle and inverting the bottle on the surface of the panel.

Method B—Test volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down. For both of the above methods, leave the reagents on the panel for a period of **one hour.** Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry

with a towel and evaluate after 24 hours at 73±3°F (23°±2°C) and 50±5% relative humidity using 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, as well as obvious and significant deterioration.

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.	DichlorAceticAcid	A
16.	Dimethylformanide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	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 Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B

45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

1.3 Acceptance Level

Results will vary from manufacturer to manufacturer. **Laboratory grade finishes should result in no more than four Level 3 conditions.** Suitability for a given application is dependent upon the chemicals used in a given laboratory.

2. Hot Water Test

2.1 Purpose of Test

The purpose of this test is to ensure the coating is resistant to hot water.

2.2 Test Procedure

Hot water, 190°F to 205°F (88°C to 96°C), shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces (177.44cc) per minute on the surface, which shall be set at an angle of 45-degrees, for a period of five minutes.

2.3 Acceptance Level

After cooling and wiping dry, the finish shall show no visible effect from the hot water.

3. Impact Test

3.1 Purpose of Test

The purpose of this test is to evaluate the ductility of the coating.

3.2 Test Procedure

A one-pound ball approximately 2" (50.8mm) in diameter shall be dropped form a distance of 12" (304.8mm) onto a flat horizontal surface, coated to manufacturer's standard manufacturing method.

3.3 Acceptance Level

There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.

4. Paint Adhesion on Steel Test

4.1 Purpose of Test

The paint adhesion test is used to determine the bond of the coating to steel. This does not apply to non-steel products.

4.2 Test Procedure

This test is based on ASTM D2197-86 "Standard Method of Test for Adhesion of Organic Coating". Two sets of eleven parallel lines 1/16" (1.587mm) apart shall be cut with a razor blade to intersect at right angles 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 for one minute. Examine under 100 footcandles of illumination.

4.3 Acceptance Level

Ninety or more of the squares shall show finish intact.

5. Paint Hardness on Steel Test

5.1 Purpose of Test

The paint hardness test is used to determine the resistance of the coatings to scratches.

5.2 Test Procedure

Pencils, regardless of their brand, are valued in this way: 8-H is the hardest, and next 11 order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which are 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.

5.3 Acceptance Level

The paint shall have a hardness of 4-H minimum.

2.07 SOURCE QUALITY CONTROL TESTING OF FUME HOODS

A. Evaluation of manufacturer's standard product shall take place in manufacturer's own test facility, with testing personnel, samples, apparatus, instruments, and test materials supplied by the manufacturer at no cost to the Owner.

B. Submit test report consisting of the following test parameters and equipment for each hood width and configuration specified.

C. Hood shall achieve a rating of 4.0 AM 0.05 PPM or better. Tested to ASHRAE-110-1995.

D. Test facility: Sufficient size to provide unobstructed clearance of five feet each side and ten feet in front of fume hood. Provide make-up air to replace room air exhausted through fume hood and to obtain a negative 0.2" w.g. room pressure. Introduce make-up air in a manner that minimizes drafts in front of hood to less than 20% of the face velocity. Connect 100 feet per minute air velocity through face of fume hood. Adjustment in blower shall vary face velocity down to 75 feet per minute.
   1. Examine facility to verify conformance to the requirements of this Section.
   2. Test room shall be isolated from all personnel during test procedure.

E. Testing equipment:
   1. Properly calibrated hot wire thermal anemometer probes equal to Sierra Model 600-02; correlate with computer data acquisition format to provide simultaneous readings at all points.
   2. Pitot tube and inclined manometer with graduations no greater than 0.2" of water equal to F.W. Dwyer Model 400. Calibration curves based on 20. Pitot traverse readings and correlated to a digital readout indicator to provide quick and accurate adjustment of airflows.
   3. Tracer gas: Sulfur hexa-fluoride supplied from a cylinder at a test flow rate of four liters per minute.

4. Ejector system: Tracer gas ejector equal to IHE No. 525-014. Submit sufficient proof of ejector system calibration.
5. Critical orifice: Sized to provide tracer gas at four liters per minute at an upstream pressure of 30 PSIG.
6. Detection instruments: Ion Track Model 61 Leak Meter II sulfur hexa-fluoride detector instrument.
7. Recorder with accuracy better than plus or minus 0.5% of full scale.
8. Three dimensional manikin, overall height 67", clothed in a smock.
9. Titanium tetrachloride glass modules. CAUTION: Titanium tetrachloride is corrosive and irritating; skin contact or inhalation shall be avoided.
10. One dozen 30-second smoke bombs.

F. Preliminary Test and Data:
1. Provide sketch of room indicating room layout, location of significant equipment, including test hood and other hoods. Provide sketch of air supply system indicating type of supply fixtures.
2. Reverse airflows and dead space:
   a. Swab strip of titanium tetrachloride along both walls and floor of hood in a line 6" behind and parallel to the hood face and along the top of the face opening. Swab an 8" diameter circle on the back of the hood. All smoke should be carried to the back of the hood and exhausted.
   b. Test the operation of the bottom air bypass airfoil by running the cotton swab under the airfoil.
   c. If visible fumes flow out of the front of the hood, the hood fails the test and receives no rating.
3. Face velocity measurements: Face velocity shall be determined by averaging minimum of four and maximum of eight readings at the hood face. Take readings at center of a grid made up of sections of equal area across the top half of the face and sections of equal area across the bottom half of the face. Take simultaneous readings at each point with a series of calibrated hot wire anemometers over a one-minute period of time. Probes shall be correlated to a computer data acquisition package, which will provide an average of each reading over that one-minute period and also an overall average. During the one-minute monitoring period, all velocities must automatically update average at a maximum of four-second intervals.

G. Test Procedure:
1. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up or down. Position sash in the full open position.
2. Measure exhaust airflow with the baffles in position to give maximum airflow. Measure exhausts air volume with baffles' position to give minimum airflow. Verify that the air volume at minimum airflow is not less than 95% of the exhaust air volume at maximum airflow. Hoods exceeding this fail the test and receive no rating.
3. Take a static pressure reading using methods assuring an accurate reading, in an area of the ductwork no more than three feet nor less than one foot above the exhaust collar. Static pressure loss shall not exceed values given under Design Requirements in Part 1 of this Section.
4. Install ejector in test positions. For a typical bench hood, three positions are required: left, center and right as seen looking into the hood. In the left position the ejector centerline is 12" from the left inside wall of the hood; center position is equal distance from the inside sidewalls; and the right position is 12" from the right inside wall. The ejector body is 6" in from the hood face in all positions. Location of ejector may require modification for hoods of unusual dimensions.
5. Position manikin in front of the hood, centered on the ejector.

6. Position detector probe in the region of the nose and mouth of the manikin. Take care that method of attachment of the probe does not interfere with the flow patterns around the manikin. Position nose of manikin 9" in front of ejector (3" in front of sash).
7. Open tracer gas block valve. Correlate readings with a computer data acquisition package, which is capable of monitoring and visually recording a minimum of one reading per second for a minimal three minute time period at each of the three positions.
8. The control level rating of the hood shall be the maximum of the three average values for the three test positions.
9. Record performance rating of the fume hood as XXAMyyy, where XX equals the release rate in liters per minute (4.0) and AM represents the as manufactured test sequence and yyy equals the control level in parts per million.
10. All data on the above test conditions including instrumentation and equipment, test conditions, preliminary test and data information shall be provided on a one page report, including a printout of the average face velocities, and a separate graph performance curve on all three tracer gas positions.

H. Constant Volume/Bypass and VAV/Conventional Fume Hoods:
1. Conduct test as outlined above with the sash open.
2. Ignite a smoke bomb within the fume hood work area to verify that the fumes are quickly and efficiently carried away. Move the lighted bomb about the fume hood work area, checking near fume hood ends and work surface to verify that there is no reverse flow of air at these locations.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Installation:
1. Install fume hoods and equipment in accordance with manufacturer's instructions.
2. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

B. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations.

3.02 FIELD QUALITY CONTROL TESTING OF FUME HOODS

A. Field testing requirements:
1. Use only qualified personnel to perform tests in field to verify proper operation of the fume hoods before they are put in use.
2. Perform tests after installation is complete, the building ventilation system has been balanced, all connections have been made, and written verification has been submitted that the above conditions have been met.
3. Verify that the building make-up air system is in operation, the doors and windows are in normal operating position, and that all other hoods and exhaust devices are operating at designed conditions.
4. Correct any unsafe conditions disclosed by these tests before request of test procedures.

B. Testing equipment:
1. Properly calibrated hot wire thermal anemometer equal to Alnor Model No. 8500D-1 Compuflow.
2. Supply of 30-second smoke bombs.

3. Supply of titanium tetrachloride.

C. Test procedure
1. Check room conditions in front of fume hood using a thermal anemometer and a smoke source to verify that the velocity of cross drafts does not exceed 20% of the specified average fume hood face velocity. Eliminate any cross drafts that exceed these values before proceeding.
   a. CAUTION: Titanium tetrachloride fumes are toxic and corrosive. Use sparingly; avoid inhalation and exposure to body, clothing and equipment that might be affected by corrosive fumes.
   b. NOTE: No fume hood can operate properly if excessive cross drafts are present.

2. Perform the following test to verify conformance of actual fume hood face velocities to those specified. Turn on the exhaust blower with the sash in full open position. Determine the face velocity by averaging the velocity of six readings taken at the fume hood face: at the centers of a grid made up of three sections of equal area across the top half of the fume hood face and three sections of equal area across the bottom half of the fume hood face. **If not in accordance with specifications, refer to manufacturer's Troubleshooting Guide for aid in determining cause of variation in airflow.**
3. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up or down.

D. Field testing of airflow in fume hoods:
1. Turn fume hood exhaust blower on. With sash in the open position check airflow into the fume hood using a cotton swab dipped in titanium tetrachloride or other smoke source. Verify that airflow is into the fume hood over the entire face area by a complete traverse of the fume hood 6" inside the face. Reverse flow is evidence of unsafe conditions. Take necessary corrective actions and retest.
2. Move a lighted smoke bomb throughout the fume hood work area directing smoke across the work surface and against the sidewalls and baffle. Verify that smoke is contained within the fume hood and rapidly exhausted.
3. Calculate exhaust volume from face velocity data as determined above. Determine face velocity and exhaust volume with the auxiliary air blower off, in accordance with SEFA 1-2002.
4. With sash in the open position check airflow into the fume hood using a cotton swab dipped in titanium tetrachloride or other smoke source. Verify that airflow is into the fume hood over the entire face area by a complete traverse of the fume hood 6" inside the face. Reverse flow is evidence of unsafe conditions. Take necessary corrective actions and retest.
5. Ignite smoke bomb at the source of auxiliary air and observe the flow of smoke/air down the face and into the hood. Close sash and observe flow patterns. Verify that operation is safe and proper.
6. Move a lighted smoke bomb throughout the fume hood work area directing smoke across the work surface and against the sidewalls and baffle. Verify that smoke is contained within the fume hood and rapidly exhausted.

3.03 ADJUSTING

A. Repair or replace defective work, as directed by [Architect] [Owner] upon completion of installation.

B. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

3.04 CLEANING

Clean equipment, touch up as required.

3.05 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of equipment to other construction activity.

B. To prevent hoods from damage by work of other trades, advise contractor of necessary precautions.

END OF SECTION 11612

SINKS, DRAINS AND TRAPS

A. Epoxy resin sinks: Integrally molded from modified thermosetting black epoxy resin, specially compounded and oven cured. Cove inside corners and pitch bottom to threaded drain outlet.
   1. Reference Section 12345 Epoxy Resilient Products and drawings and schedules for Epoxy Sinks and sizes.

   2. Drain Location: **Back for ADA**

B. Traps: [1-1/2"] size, type [P] in [borosilicate glass].

C. Troughs: Cast epoxy resin troughs without longitudinal joints, with bottom edges coved and with bottom sloped minimum 1/8" per foot to drain. Provide cemented epoxy end caps at trough terminations. Seal joint between trough and table top watertight with acid and alkali resistant compound.

D. Reference architectural and engineering drawings (A0.1 through A1.5 and P0.1 through P2.2 for size , drain location and product numbers.

END OF APPENDIX B

LABORATORY FITTINGS

Typical for two main sinks incountertops in laboratories and sinks in prep rooms.

A. Water Service Fittings: Model # 33L217:
   1. Water service faucets and valves shall have renewable unit containing all working parts subject to wear, including replaceable stainless steel seat. Unit shall have serrations for position locking into valve body.
   2. Gooseneck vacuum breakers: Brass forgings integral with gooseneck, with renewable seat and special design valve member for fine flow control.
   3. Goosenecks shall have separate 3/8" IPS coupling securely brazed to gooseneck to provide full thread for attachment of anti-splash outlet fittings, serrated tips and filter pumps.

B. Air, Gas and Vacuum Systems Fittings:

   - Ball Value Assembly - Deck mounted removable hose end: Model 33L362G0 – Gas. Typical for countertop mounted gas fittings in prep rooms as indicated on drawings.
   - Ball Value Assembly – Panel/overhead mounted removable hose end: Model 33L 365G0- Gas. Typical for panel mounting (tombstone/monument) student tables in Room 3040. Re: 1/A0.3A

   1. Needle valves: Small pattern needle valve, straightway type with stainless steel replaceable floating cone and brass seat (non-renewable). Ten serrated end is integral with valve body.
   2. Ground key cocks: Straightway ground key cocks, individually ground and lapped and tested at 100 psi. air under water. Cocks shall have single arm long easy grip handle with screw-on type

C. Water and gas service fittings: Model 33L329CG typical for student tables in 3028 and teachers tables in 3028 and 3040. Triple service fixture vacuum breakers wrist handle.

   1. Water service faucets and valves shall have renewable unit containing all working parts subject to wear, including replaceable stainless steel seat. Unit shall have serrations for position locking into valve body.
   2. Gooseneck vacuum breakers: Brass forgings integral with gooseneck, with renewable seat and special design valve member for fine flow control.
   3. Goosenecks shall have separate 3/8" IPS coupling securely brazed to gooseneck to provide full thread for attachment of anti-splash outlet fittings, serrated tips and filter pumps.

D. Not Used

E. Turrets for gas, air, vacuum, steam or water fixtures: "Round" type design, provided with brass shanks, locknuts and washers.

F. Handles for service cocks, faucets and remote controls: Four-arm type except ground key cocks. Provide removable screw-on type colored plastic discs with letter stamped on disc in contrasting color as scheduled below:

Service	Disc/Letter Colors	Letters

Gas	Blue/White	Gas
Vacuum	Yellow/Black	Vac.
Compressed Air	Orange/White	C-Air
Cold Water	Green/White	C.W.
Hot Water	Red/White	H.W.
Steam	Black/White	Stm.
Chilled Water	Brown/White	CH.
Distilled Water	White/Black	D.W.

[Disc color for special services as determined by [Architect] [Owner]].

G. Fixture finish: Chrome finish developed by the following sequence of platings over properly prepared brass castings or forgings:

Plating	Minimum Plating Thickness
Copper (Initial)	0.000050 IN.
Nickel	0.000350 IN.
Chromium (Final)	0.000015 IN.

H. Electrical fixtures and fittings: Flush, pedestal or line type, provided in strict accordance with the current edition of the National Electric Code of the National Fire Protection Association, and with requirements of all local regulatory authorities.

1. Pedestal and line type housings: Heavy "lustrebrite" corrosion resistant aluminum alloy polished to a chrome like color.
   a. Pedestals: Provide with integral bases; low design for use on either single or double faces.

   b. Line type housings: Similar in design to pedestals; designed to be self-supporting when installed with rigid conduit.
2. Receptacles: Rated 120 volts A.C. at 20 amps., three wire grounding type with "Automatic Ground" feature. Provide single or duplex receptacles as required, with ivory or black colored molded thermo-set bodies.
3. Switches: Single pole, toggle type.
4. Flush boxes: Galvanized steel.
5. Flush plates: Chrome plated or nylon plastic.
6. Conduit: Rigid type, of size to accommodate easy pulling of wire. Boxes, component parts and fittings shall be the screw type. Provide enamel finish on exposed conduit and ferrous fittings.
7. Pedestal and line type housings, flush boxes, receptacles and flush plates must be grounded.

END OF APPENDIX C

ACCESSORY EQUIPMENT

A. Pegboards:

1. Board: Epoxy resin board finished on face and edges. Where exposed, finish back with slightly different surface texture and bevel bottom edges.
2. Pegs: Black polypropylene pegs in 5", 6-1/2" and 8" lengths, with glassware protector base. Base of pegs shall be two prong style for mechanical attachment. Do not bond pegs to board.

B. Service Support Struts: Heavy 1/4" x 1-1/2" steel channel uprights.

1. Fasten at top and bottom with U-shaped spreader and bolts, designed to support tops, box curbs, troughs, hoods, or other heavy loads.
2. Service piping and drain line hanger supports are to be provided by contractor providing these services.

END OF APPENDIX D

PLASTIC LAMINATE CASEWORK
Section 12300

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all plastic laminate casework and accessory items as specified herein. Refer to plans for specific details and requirements.

B. General Conditions: The General Conditions, Supplementary General Conditions, Special Conditions, and General Requirements apply to all work in this Division.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General millwork and custom cabinetry unless specified herein or so noted on plans as included within this section.

B. Rubber, vinyl or other finished toe base.

C. Locks master keyed to room doors and other special

locks. D. Blocking within walls.

E. Sinks, faucets, fittings, traps, stops, tail pieces, vacuum breakers, and other fixtures, electrical and mechanical runs and connections.

F. Fixture installation/services connections: Setting and installation of equipment and fixtures, and related utility connections, are provided under the other sections of the Project Specification governing that utility.

1.03 SUBMITTALS

A. Submit in accordance with General, Supplementary, and Special Conditions.

B. Submit shop drawings for approval in the form of one vellum and two bonds. Show materials, dimensions, cabinet-cut details, and sink locations.

C. Samples of colors shall be submitted upon award of contract for selection and coordination with other suppliers. Architect may request and retain samples and catalog cuts as required for accessory and special items.

1.04 QUALIFICATIONS

A. Drawings and specifications are based upon casework as manufactured for LabFitOut by STEM Solutions LLC.

Contact Jim Broderick 617-826-6111

B. Not used

C. Not used

D. In addition to requirements below, manufacturers listed herein, or requesting approval, shall submit proof of ability to provide Certificate of Compliance in AWI, Architectural Woodwork Institute Quality Certification Program, including QCP labels on finished goods.

E. The following performance details are project requirements and must be met by all Bidders whether named herein, or approved by Addendum, regardless of that Manufacturer's "Standards". Deviations will not be allowed.

1. Lamination System: Doors, finished end panels, and other decorative exterior laminate surfaces shall be laminated exterior with .028 inch (.71 mm) high-pressure plastic laminate,

and interior with .020 inch (.51 mm) high-pressure cabinet liner. Lamination with hybrid P.V.A. Type III water resistant adhesive.

2. Structural Cabinet Body: Cabinet backs shall be minimum 1/2 inch (12.7 mm) thick, inset from rear of body, and fully bound (dadoed) four sides. Provide 3/4 inch (19.1 mm) thick stiffeners fastened to back/body as specified herein. Back perimeter shall be toe-nailed with mechanical fasteners for tight interior fitment and direct connection of back panel to body, and sealed with full-perimeter high-strength hot-melt adhesive.
3. Interior Structure: All cabinets over 36 inches (914 mm) wide shall be furnished with a mechanically fastened vertical divider to reduce horizontal member/shelf deflection. Wall cabinets shall have a clear inside nominal depth of 12 inches (305 mm) unless detailed otherwise.
4. Shelf Loading: Shelves shall meet the loading/deflection standards of the National Particleboard Association.
5. Structural Drawer Body: Drawer body shall be doweled with 1/2 inch (12.7 mm) typical bottom, recessed, fully bound (dadoed) and joint-glued all four sides. Provide under body stiffeners as specified herein.
6. Drawer Suspension: Standard drawer slides shall be self-closing design, epoxy powder coated, with positive instop, outstop, and out-keeper. Dynamic (operational) load rating shall be minimum 100 lbs. (45 kg). Minimum 150 lbs. (68 kg) static load rating.
7. Structural Cabinet Support: Cabinet sub-base shall be of a separate and continuous ladder-type platform design, leveled and floor mounted prior to cabinet body placement. Material shall be exterior grade plywood. No cabinet sides-to-floor will be allowed.

F. Architect/Owners opinion and decision shall be final in the evaluation of manufacturer's products for approval to bid or award of contract.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Laminated Plastics/Finishes:

1. High-pressure chemical-resistant plastic laminate, .034 inch (.86 mm) in thickness, for exterior surfaces shall meet NEMA LD3-2000 VGS standards including thickness.
2. Exterior Color Selection Available:
   a. Standard finish from casework manufacturer's standard stock colors consisting of wood grain patterns and solid colors. Minimum of 200 selections available.
   b. Total of 5 different colors available per project.
   c. Direction of wood grain shall be vertical on door, end panels, fascia panels, and exposed backs; horizontal on drawer faces, aprons, and top rails.
3. Plastic Laminate Balancing Sheet: White high-pressure cabinet-liner, .020 inch (.051 mm) in thickness shall meet NEMA LD3-2000 CLS standards. Use for balancing exterior surface laminates.
4. Countertop High-Pressure Plastic Laminate:
   a. High-pressure chemical-resistant plastic laminate, textured finish .048 inch (1.22 mm) thickness or .042 inch (1.07 mm) postforming grade as detailed. Color as selected from

manufacturer's stock standard patterns and solid colors.

b. Heavy gauge neutral colored backing sheet for balanced construction.

5. Pressure Fused Laminate:
   a. Melamine resin impregnated, 85 gram PSM average, thermofused to core under pressure.

   b. Shall meet NEMA LD3-2000 VGL standards and NEMA LD3-2000 CLS standards, except thickness.

   c. White pressure fused laminate for cabinet interiors behind door and drawers, interiors of all open cabinets, and underside of wall cabinets.

   d. Shall be balanced at all concealed surfaces with same thermofused melamine. Unsurfaced coreboard or simple backers not allowed.

B. High Performance Core:

1. Shall be particleboard, minimum 47 lb. (21.3 kg) density, of balanced 3-ply construction with moisture content not to exceed 8%. Particleboard shall conform to ANSI A208.1-1999, Grade M-3.

2. Cabinet components shall be of the following minimum core thicknesses:

   a. 1/2 inch (12.7 mm): cabinet backs, drawer body, and drawer bottoms.

   b. 3/4 inch (19.1 mm): door and drawer face, base, wall, and tall cabinet tops and bottoms, cabinet sides, drawer spreaders, cabinet back rear hangstrips, structural dividers, exposed cabinet backs, and shelves of less than 30 inch (762 mm) span.

   c. 1 inch (25.4 mm): product-specific work surfaces and library stack shelving unless stack fitted with vertical divider. Shelves over 30 inch (762 mm) span.

C. Edging types. Provide one or more of the following in accordance with "Edging Locations":

1. FlatEdge PVC/ABS. .020 inch (.51 mm). Solid, high-impact, purified, color-thru, acid resistant PVC/ABS edging machine-applied with hot melt adhesives, automatically trimmed face, back and corners for uniform appearance.

2. 3 mm thick PVC/ABS. Solid, high-impact, purified, color-thru, acid resistant, pre-lamination primed edging, machine-applied with hot melt adhesives, automatically trimmed, inside/outside length-radiused for uniform appearance, buffed and corner-radiused for consistent design.

D. Edging Locations. Provide the above specified edging types at the following locations, of the following colors:

1. Door/Drawer-Frontedging: FlatEdge PVC/ABS, color matched to door/drawer face or as selected.

   [ ] 3mm PVC/ABS selected from 30 standard LSI colors, color matched to LSI standard laminates.

2. Cabinet body front-facing edge, including door/drawer front spacer rail: FlatEdge PVC/ABS, color matched to door/drawer face or as selected.

3. Front-facing edge of interior body components, interior dividers, shelf, and top edges of drawer body: FlatEdge PVC/ABS to match adjacent interior surface color.

E. Hardware

1. Hinges:

[X] a. Heavy duty, five knuckle 2 3/4 inch (69.9 mm) institutional type hinge shall meet ANSI/BHMA A156.9 Grade 1 requirements. Mill ground, hospital tip, Teflon coated tight pin feature with all edges eased. Hinge shall be full wrap around type .095 inch (2.4 mm) thick. Each hinge shall have minimum of 9 screws, #7, 5/8 inch (15.9 mm) FHMS to assure positive door attachment.

b. One pair per door to 48 inch (1219 mm) height, One and one-half pair over 48 inches (1219 mm) in height. Hinge shall accommodate 13/16 inch (20.6 mm) thick laminated door and allow 270 degree swing.

c. Finish shall be ChromeCoat Powder Finish, Black, White Dove Grey, Haze, or Light Beige epoxy coated.

2. Pulls:

a. Wire design, , 4 inches (101.6 mm), in ChromeCoat powder finish, High-Polish Chrome or Brass.

3. Sliding Door Hardware:

a. Frameless 1/4 inch (6.4 mm) glass sliding doors: double track rolling door assembly.

b. Framed 13/16 inch (20.6 mm) thick stile and rail sliding doors: top mounted track with dual roller hangers. Vertical adjustment for accurate alignment.

4. Drawer Slides:

a. Standard Drawers:, self-closing design, epoxy powder coated White, with positive in-stop, out-stop, and out-keeper to maintain drawer in 80% open position. Captive nylon rollers, front and rear. Minimum 100 lb (45 kg) dynamic load rating at 50,000 cycles.

b. Not Used

c. Provide body mounted molded rails for hanging file system for legal or letter size as indicated by manufacturer's model number. Cutting or machining of drawer body/face not allowed.

d. Paper Storage Drawers: Full extension, 3-part progressive opening slide, minimum 100 lb (45 kg), zinc plated or epoxy coated at manufacturer's option.

5. Catches: Catch shall provide opening resistance in compliance with the Americans with Disabilities Act.

a. Provide top-mounted magnetic catch for base and wall cabinet door. Provide two at each tall cabinet door. Catch housing shall be molded in White. ADA.

(SPECIFIER NOTE: Not required when specifying concealed hinges.)

b. Roller catch for mobile cabinets.

6. Adjustable Shelf Supports: Shall be.1 twin pin design with anti tip-up shelf restraints for

both 3/4 inch (19.1 mm) and 1 inch (25.4 mm) shelves. Design shall include slot for ability to mechanically attach shelf to clip. Load rating shall be minimum 300 lbs. (136 kg) each support without failure. Cabinet interior sides shall be flush, without shelf system permanent projection.

7. Wardrobe Rod: Shall be 1 1/16 inch (27 mm) rod, , supported by flanges.
8. Coat Hooks:

   a. Single coat hooks, wall mount - Bright Zinc. b. Double

   coat hooks, wall mount - Bright Zinc.

   c. Double coat hooks, ceiling mount –Bright Zinc.
9. Molded Trays:

   a. High-impact Polyethylene with cardholders. Color, White.

   b. Sizes: 10 1/2 inches W x 3 1/2 inches H x 19 inches D (267 mm W x 89 mm H x 483 mm D), 14 1/2 inches W x 3 1/2 inches H x 19 inches D (368 mm W x 89 mm H x 483 mm D)

   c. Trays shall glide on molded, twin pin side rails, adjustable 1 1/4 inches (32 mm) on center. Color, White.
10. Molded Personal Pencil Drawer: High-impact 100 Polystyrene with in-stop, out-stop, and self-closing features. Provide under top mounted 100 lb (45 kg) self-closing slides. Twelve compartment drawer body, and slides, Black. Provide where indicated on plans as "molded pencil drawer".
11. Locks: Where indicated, shall be disc tumbler lock keyed alike and master keyed. Dull chrome finish.

    a. Hinged doors and drawers National Lock No. M4-7054.

    b. Sliding doors, 13/16 inch (20.6 mm) thick, National Lock No. M4-0057. c.

    1/4 inch (6.4 mm) sliding panel doors, National Lock No. M2-0225.
12. Wheel Casters:

    a. LH-386 swivel casters for standard mobile cabinets shall be plate type caster with ball bearing swivel. Size shall be 5 inches (127 mm) for tall mobiles, with 1 1/16 inch (27 mm) wide tread for carpet or hard cover floor. Wheel brakes on front two casters. Minimum 300 lb (136 kg) load rating per caster.

    b. Casters for low mobiles, book trucks, and low moveable carts shall be LH-390 4 inches x 1 1/16 inches (101.6 mm x 27 mm). Minimum 275 lb (124.7 kg) load rating per caster.
13. Mobile Structure:

    a. All mobile cabinets shall be designed with a structurally layered base to which above specified plate-type casters are bolted.

    b. Optional mouse tray (where shown) for both right or left- handed use.

F. Detailed Requirements For Cabinet Construction:

1. Sub-Base:

a. Cabinet sub-base shall be separate and continuous (no cabinet body sides-to-floor), water resistant exterior grade plywood with concealed fastening to cabinet bottom. Ladder-type jobsite construction of individual front, back, and intermediates, to form a secure and level platform to which cabinets attach.

b. Sub-base at exposed cabinet end panels shall be recessed 1/4 inch (6.4 mm) from face of finished end, for flush installation of finished base material by other trades.

2. Cabinet Top and Bottom:

a. Solid sub-top shall be furnished for all base and tall cabinets.
b. At cabinets over 36 inches (914 mm), bottoms and tops shall be mechanically joined by a fixed divider.

c. Exterior exposed wall cabinet bottoms shall be white pressure fused laminate both sides. Assembly devices shall be concealed on bottom side of wall cabinets.

3. Cabinet Ends:

a. Holes drilled for adjustable shelves 1 1/4 inches (32 mm) on center.

b. Exposed exterior cabinet ends shall be laminated with high-pressure plastic laminate, balanced with high-pressure cabinet-liner interior surface.

4. Fixed And Adjustable Shelves:

a. Thickness shall be 3/4 inch (19.1 mm) at standard cabinetry, and 1 inch (25.4 mm) at library stack shelving.

5. Cabinet Backs:

a. Cabinet back shall be fully bound (dadoed) into sides, top, and bottom, recessed 7/8 inch (22.2 mm) from cabinet rear. Rear, unexposed, side of back shall be toe-nailed to cabinet body with mechanical fasteners and solidified with a continuous bead of industrial grade hot melt adhesive.

b. Hang rails shall be located at rear of cabinet back and fastened to cabinet sides. Provide minimum of 2 at base, 2 at wall, and 3 at tall cabinets.

c. Exposed exterior backs shall be high-pressure plastic laminate balanced with high-pressure cabinet-liner.

6. Door And Drawer Fronts:

a. Laminated door and drawer fronts shall be 13/16 inch (20.6 mm) thick for all hinged and sliding doors. Drawer fronts and hinged doors shall overlay the cabinet body. Maintain a maximum 1/8 inch (3.2 mm) reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.

b. Stile and Rail doors shall be 13/16 inch (20.6 mm) thick with full 1/4 inch (6.4 mm) plate glass. Available hinged or sliding. All exposed lite-opening edges shall be trimmed and glazed with extruded glazing bead.

c. Frameless sliding glass doors shall be 1/4 inch (6.4 mm) thick plate glass with ground and polished edges. Fit with anodized aluminum shoes and nylon rollers.

7. Drawers:

a. Drawer fronts shall be applied to separate drawer body component sub-front.

b. Drawer sides shall be doweled and glued to receive front and back, machine squared and held under pressure, to set.

c. Drawer bottom shall be fully bound (dadoed) into front, sides, and back. Routing, in drawer body for bottom, shall receive glue. Reinforce drawer bottoms with 1/2 inch (12.7 mm) x 4 inch (101.6 mm) front-to-back intermediate underbody stiffeners, mechanically fastened. One at 24 inches (610 mm), two at 36 inches (914 mm), and four at 48 inches (1219 mm).

d. Paper storage drawers shall be fitted with full width hood at back.

8. Vertical and Horizontal Dividers: One of the following as indicated by cabinet number:

a. Natural hardboard 1/4 inch (6.4 mm) thick, smooth both faces. Secured in cabinet with molded plastic clips.

b. Pressure Fused laminate 3/4 inch (19.1 mm) thickness. Sub-dividers secured in cabinet with molded plastic clips or dowels. Structural dividers in cabinets over 36 inches (914 mm) wide secured in cabinet with mechanical euro fasteners.

9. Door/Drawer Front Rail: Provide minimum 3/4 inch (19.1 mm) x 6 inch (152 mm) x full width cabinet body rails immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions, close off reveal, and be locator for lock strikes.

10. ADA, Americans with Disabilities Act Requirements: The following special requirements shall be met, where specifically indicated on architectural plans as "ADA", or by General Note. Shall be in compliance with Federal Register Volume 56, No. 144, Rules and Regulations:

a. Countertop height: With or without cabinet below, not to exceed a height of 34 inches (864 mm) A.F.F., (Above Finished Floor), at a surface depth of 24 inches (610 mm).

b. Kneespace clearance: Shall be minimum 29 inches (737 mm) A.F.F. at apron, and 30 inches (762 mm) clear span width.

c. 12 inch (305 mm) deep shelving, adjustable or fixed: Not to exceed a range from 9 inches (229 mm) A.F.F. to 54 inches (1372 mm) A.F.F.

d. Wardrobe cabinets: Shall be furnished with rod/shelf adjustable to 48 inches (1219 mm) A.F.F. at a maximum 21 inch (533 mm) shelf depth.

e. Sink cabinet clearances: In addition to above, upper kneespace frontal depth shall be no less than 8 inches (203 mm), and lower toe frontal depth shall be no less than 11 inches (279 mm), at a point 9 inches (229 mm) A.F.F., and as further described in Volume 56, Section 4.19.

G. Countertops:

1. High-pressure plastic laminate bonded to core. Thickness as shown on plans. Underside shall be properly balanced with heavy gauge backing sheet. Furnish countertops with edge treatment and design profile as shown on drawings. Provide tops in as long as practical continuous lengths. Provide field glued splines at joints. No joints closer than 24 inches (610 mm) either side of sink cutout.

2. Mobile cabinet tops shall be high-pressure plastic laminate on exterior and high-pressure cabinet-liner on underside. Edges shall be high-impact 3 mm PVC/ABS.

H. Workmanship:

1. All exposed vertical exterior cabinet surfaces shall be .028 inch (.71 mm) high-pressure laminate, color as selected from casework manufacturer's standards, over 200 colors/wood

grains available. Laminate surface/balancing liner to core under controlled conditions by approved and regulated laminating methods to assure a premium lamination. Natural-setting hybrid P.V.A. Type III water resistant adhesives that cure through chemical reaction, containing no health or environmentally hazardous ingredients, are required. Methods requiring heat are not allowed; "contact" methods of laminating are not allowed.

2. Cabinet parts shall be accurately machined and bored for premium grade quality joinery construction utilizing automatic machinery to insure consistent sizing of modular components. End panels shall be doweled to receive bottom and top.
3. Back panel shall be fully bound (dadoed) into, and recessed 7/8 inch (22.2 mm) from the back of cabinet sides, top, and bottom to insure rigidity and a fully closed cabinet. Cabinet back shall be mechanically fastened from rear of body for tight interior fit and sealed with full-perimeter high-strength hot-melt adhesive.
4. Drawer bottom shall be fully bound (dadoed) and glued into and recessed 1/2 inch (12.7 mm) up from the bottom of sides, back, and sub-front. Sides of drawer shall be doweled to receive drawer back and sub-front.
5. 3/4 inch (19.1 mm) thick hang rails shall be mechanically fastened to end panels of all wall, base, and tall cabinets for extra rigidity and to facilitate installation.
6. All cases shall be square, plumb, and true.
7. Case body and drawer workmanship and quality of construction shall be further evidenced by manufacturer being certified in the AWI Quality Certification Program.
8. Provide removable back panels and closure panels for plumbing access at all sink cabinets, and where shown on drawings.

I. Mobile Cabinet Design and Construction:

1. All mobile cabinets shall be designed with a structurally layered base, to which plate-type casters are bolted.
2. No exposed fasteners.
3. Design profile shall allow doors to swing open a full 270 degrees and overlay cabinet sides.
4. Unit top shall be edged with 3 mm PVC/ABS and overhang case front, back, and sides to function as a bumper system.

3. Relocatable Shelf System: Shelves, unless divider-attached, shall be designed to be relocatable by facilities personnel. Cabinet bodies shall be factory pre-drilled to accept continuous shelf channel, relocatable to 1 1/4 inch (32 mm) increments. Shelf system remains vandal resistant.

4. Heavy Weight Shelf Support: Provide 1 1/4 inch (32 mm) by 1 1/4 inch (32 mm) 14 gauge steel tubing under all shelves in cabinets 36 inches (914 mm) wide and wider, structurally fastened to cabinet end panels, and shelf. White epoxy powder coat to match other interior components.

5. Doors: Refer to drawings for type, swing, and location. All doors shall inset flush between cabinet/compartment end panels.

   a. Grille Doors: 5/16 inch (7.9 mm) perimeter/reinforcing, and 3/16 inch (4.8 mm) interior vertical wire. Door and welded .095 inch (2.4 mm) hinges in White epoxy powder coat.

   b. Solid Laminate Doors: Balanced construction with .028 inch (.71 mm) high-pressure plastic laminate exterior, high-pressure cabinet-liner interior, 13/16 inch (20.6 mm) total thickness. Laminate surface/balancing liner to core under controlled conditions, by approved and regulated laminating methods to assure a premium lamination. Natural-setting hybrid P.V.A. Type III water resistant adhesives that cure through chemical reaction, containing no health or environmentally hazardous ingredients, are required.

   c. Hinges: Five knuckle safety tip hinge with 2 3/4 inch (69.9 mm) barrel, heavy gauge .095 inch (2.4 mm) with non-loosening specially designed furniture screw attachment. Non-binding design shall allow 180 degree door swing. Finished in White epoxy powder coat.

   d. Hasp: Hasp system shall be of one piece construction, no moving parts. Hand grip shall be minimum 7 3/4 inch (196.9 mm) U-shaped of welded 5/16 inch (7.9 mm) rod. Hasp body plate shall contain padlock hole of sufficient size to accommodate all typically available combination/key padlock. White epoxy powder coat. Provide integral nylon stop for door-stop. Provide pre-numbered labels and clear cover for owner placement.

6. Edging: Cabinet Body Edging shall be high-impact, color-thru 3 mm PVC/ABS, length radiused both sides. Door Edging shall be high-impact, color-thru 3 mm PVC/ABS, length radiused and corner radiused inside and outside. Edging shall be hot melt applied, trimmed, radiused and buffed by singular automatic machinery for consistency. No exceptions. Choice of 30 manufacturer's standard colors.

7. Workmanship: Premium standards of consistent reveals, bevels, and edge treatments. No exposed mechanical body fasteners. Color choices at laminate door face and exterior exposed cabinet body end panels shall be of over 200 manufacturer's standards. Instrument Storage Cabinets shall be shipped factory pre-assembled, including doors of either right or left mounting.

2.02 STEEL FABRICATIONS, ASSEMBLIES, AND SUPPORT DEVICES:

Provide, of the size and configuration as detailed, or as indicated by product number. Exposed welds shall be ground smooth. Finish shall be Black Powder Coat.

A. Heavyweight Table System: Shall be constructed of 2 inch x 2 inch (50.8 mm x 50.8 mm) 12 gauge (2.66 mm) steel legs and four sided under-top surround. End assemblies shall be factory pre-welded, with welded length-connectors for 3/8 inch (9.53 mm) diameter double bolted 2 inch x 2 inch (50.8 mm x 50.8 mm) 12 gauge (2.66 mm) horizontal top supports. Provide levelers with non-rusting foot pad of tear drop design, for attaching to floor, as directed by contract documents. Provide leg shoes as indicated by product designation. Work top attachment brackets shall be pre-welded to horizontal and end frame members.

B. C-Frame Bench and Table Assemblies: Shall be constructed of 1 1/2 inch (38.1 mm) wide x 2 1/2 inch (63.5 mm) deep 12 gauge (2.66 mm) steel tube, corner welded, and ground smooth. Provide 3/8 inch (9.5 mm) diameter levelers with non-rusting foot pads. Horizontal connectors shall be 1 1/2 inch x 1 1/2 inch (38.1 mm x 38.1 mm) 12 gauge (2.66 mm) bolted to vertical C- frames. Table frames with laminate back panel horizontal connectors shall incorporate 1 inch x 1 inch (25.4 mm x 25.4 mm) channel, to receive panel.

C. Table Frame Cabinet Hanging System: Provide 12 gauge (2.66 mm) rolled-channel horizontal top member and tubular horizontal lower cabinet standoff. Provide, for the attachment and relocation of product designated cabinet types, at assemblies specified or indicated by product designation.

D. Steel Support Legs at Cabinet Assemblies: Shall be 2 inch x 2 inch (50.8 mm x 50.8 mm) 12 gauge (2.66 mm) steel with welded top or side plate according to product design. Provide 3/8 inch (9.5 mm) diameter leveler with non-rusting foot pad of tear drop design for floor attachment, and leg shoe according to product design.

E. Cantilevered Work Top Support Bracket: Shall be of 1 1/2 inch x 1 1/2 inch (38.1 mm x 38.1 mm) 12 gauge (2.66 mm) steel vertical, welded and ground smooth to 1 1/2 inch wide x 2 1/2 inch deep (38.1 mm x 63.5 mm) 12 gauge (2.66 mm) horizontal, of the overall size as indicated on contract documents, or as designated by product number. Provide molded cap inserts at wall and countertop fastener holes.

F. Angular Work Top Support Bracket: Shall be factory welded 1 1/2 inch x 1/4 inch (38.1 mm x 6.4 mm) flat steel of vertical, horizontal, and angular design according to size indicated on contract documents, or designated by product number.

G. Free Standing Science Island Pedestal Group: Shall be of angular and channel shapes, minimum 1 1/2 inch x 1 1/2 inch (38.1 mm x 38.1 mm) x 1/8 inch (3.2 mm) coated steel

consisting of factory pre-welded four sided pedestal support frame of four vertical, four upper, and four lower members. Provide cabinet hanging rails four sides as indicated by product designation. Upper frame shall be factory welded and bolted rolled channels and brackets to support work top and related perimeter aprons. Overall size and shape as directed by product number.

PART -EXECUTION

3.01 COORDINATION

A. Coordinate work of this Section with related work of other Sections as necessary to obtain proper installation of all items.

B. Verify site dimensions of cabinet locations in building prior to fabrication.

3.02 INSTALLATION

A. Storage and Protection: Casework shall be protected in transit. Store under cover in a ventilated building not exposed to extreme temperature and humidity changes. Do not store or install casework in building until concrete, masonry, and drywall/plaster work is dry.

B. Workmen: Install casework under the supervision of the manufacturer's representative with factory-trained mechanics certified by manufacturer.

C. Workmanship:

1. Erect casework straight, level and plumb and securely anchor in place. Scribe and closely fit to adjacent work. Cut and fit work around pipes, ducts, etc.
2. Install all items complete and adjust all moving parts to operate properly.
3. Leave surfaces clean and free from defects at time of final acceptance.

D. Guarantee: All materials shall be guaranteed for a period of 5 years from manufacturer's defects and workmanship.

E. Clean Up: Remove all cartons, debris, sawdust, scraps, etc., and leave spaces clean and all casework ready for Owner's use.

THIS SPECIFICATION IS SUBJECT TO CHANGE WITHOUT NOTICE. With respect to LabFitOuts continuing program of developing quality Casework systems and techniques,. reserves the right to change specifications, products, or materials without notice.

END OF SECTION 12300

EPOXY RESIN COUNTERTOPS
Section 12 366

PART 1 – GENERAL

1.0 SUMMARY

A. Modified epoxy resin countertops, fittings monuments, sinks,, and accessories as Supplied by LabFitout LLC
B. Section Includes
   1. Work surface
   2. Sinks and Accessories

1.01 ALTERNATE PROPOSALS

Alternate manufacturers shall comply with the minimum design requirements and the minimum performance requirements. A notarized letter stating full compliance must be included in the alternate proposals signed by an officer of the manufacturer to ensure compliance.

Request for substitutions shall follow procedures set forth in Section 01000-General Requirements

1.02 MINIMUM DESIGN REQUIREMENTS

Modified Epoxy Resin Countertops and Sinks

1) Tops, box curbs, splash rim: Provide smooth, clean exposed tops and edges in uniform plane free of defects.Make exposed edges and corners uniformly rounded.
2) Top thickness: 1" thickness, unless noted otherwise with tolerance not exceeding plus or minus 1/32".Provide front and end overhang of 1" over base cabinets, formed with continuous drip groove on under surface ½ inch from edge.
3) Material:Chemical and abrasion resistant, durable top of 1" thick cast material of epoxy resins and inert products, cast flat, with a uniform non-glare black matte finish.
4) Backsplash curb:Same material as top, 4" high, unless otherwise indicated on drawings, butt jointed and cemented to top.Provide where tops abut wall surfaces.Include end curb where top abuts end wall.
5) Cast modified epoxy resin:Factory molded tops of modified epoxy resin formulation, uniform thickness throughout full thickness.Provide in smooth, non-specular finish of color indicated.
   a) Color:As selected by architect from manufacturer's full range.
   b) Physical properties:Comply with the following minimum requirements:
      i) Tensile Strength: 11,151 psi
      ii) Flexural Modulus: 2.13 x 10^6 psi
      iii) Flexural Strength:17,171 psi
      iv) Compressive strength:36,102 psi
      v) Hardness (Rockwell M):109
      vi) Water absorption (24 hours):+0.019
      vii) Heat distortion point:342° F (172°C)
      viii) Thermal shock resistance:Highly resistant.
   c) Chemical resistance:Spot test with the following reagents in standard laboratory concentrations, in contact with finished top for 24 hours;top shall be entirely unaffected or show only slight dulling of finish:

i) Glacial acetic acid, nitric acid, sulfuric acid, ammonium hydroxide, amyl acctate, benzene, ethyl acetate, ethyl ethyer, hydrogen peroxide, methyl ethyl ketone, phenol, trichloroethylene, zinc chloride, hydrochloric acid, phosphoric acid, chromic acid, calcium hypochlorite, acetone, aqua regia, butyl alcohol, formaldehyde, methyl alcohol, kerosene, silver nitrate, xylene.

d) Workmanship:Cast surfaces very smooth with factory cutouts for sinks and drip grooves. Fabricate plain butt-type joints assembled with epoxy adhesive.

Modified Epoxy Resin Sinks

1) Sink Fabrication:Molded in one piece with smooth surfaces, coved corners and bottom sloped to outlet, ½" (13 mm) minimum thickness as manufactured by Epoxyn Products.

   a) Provide with epoxy resin outlets.
   b) Provide integral sinks in epoxy countertops, bonded to countertops with invisible joint line.

Pegboards

1) Provide pegboards in the size and quantity indicated on the drawings.
2) Board:Epoxy resin board finished on face and edges.Where exposed, finish back with slightly different surface texture and bevel bottom edges.
3) Pegs: polypropylene pegs in 5", 6½" and 8" lengths, with glassware protector base.Base of pegs shall be two-prong style for mechanical attachment.Do not bond pegs to board.
4) Drip pan:Include with pegboard, stainless steel drip pan with spout for attachment to tubing.

1.03 SUBMITTALS

A. Shop Drawings: Provide 1/2" = 1'-0" scale elevations of all components, cross sections, rough-in and anchor placements, tolerances and clearances. Provide 1/4" = 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.

B. Provide color selection charts from manufacturer's standard colors.

C. Instruction: Submit for review and approval written instructions in booklet form providing additional details on safe and proper operation and maintenance.

1.04 QUALITY ASSURANCE

A. Single source responsibility: Laboratory furniture system and components shall be manufactured or furnished by a single laboratory furniture company.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality casework and equipment, and shall meet the following minimum requirements:
   1. Five years or more experience in manufacture of laboratory casework.
   2. Ten or more installations of equal or larger size and requirements.

1.05 REFERENCE STANDARDS

A. All casework, work surface and service fixture construction and performance characteristics shall be in full compliance with SEFA (Scientific Equipment and Furniture Association) standards. At the owner's request, independent, third party testing must be submitted validating compliance and adheres to the architectural specifications.

1. SEFA 2.3 – Installation of Scientific Laboratory Furniture and Equipment.
2. SEFA 3 – Work Surfaces
3. SEFA 7 – Laboratory and Hospital Fixtures
4. SEFA 8 – Laboratory Furniture

1.06 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of laboratory furniture system so that spaces are sufficiently complete that material can be installed immediately following delivery.
B. Protect finished surfaces from soiling or damage during handling and installation.

1.07 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
   1. Windows and doors are installed and the building is secure and weather tight.
   2. Ceiling, overhead ductwork and lighting are installed.
   3. All painting is completed and floor tile is installed.

END OF SECTION