SECTION 12345 - ENTERPRISE– Free Standing Laboratory Workstation System

PART 1: DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:
   1. Kewaunee Scientific Corporation's, **ENTERPRISE Free Standing Laboratory Workstation System**, a modular component system used to create work space and storage assemblies. Furnish all cabinets and casework, including tops, supporting structures, free standing tables and miscellaneous items equipment as listed in these specifications, or equipment schedules, including delivery to the building, setting in place, leveling, scribing to walls and floors as required. Furnishing and installing all filler panels, knee space panels and scribes as shown on drawings.

   2. Pre-plumbing and pre-wiring **ENTERPRISE Workstations** where called for in these specifications, equipment schedules or shown on drawings. When pre-plumbed plumbing service piping shall terminate at a single point connection at the top of the vertical support member as specified or as shown on drawings. Pre-wired power service shall terminate at a power cord at the top of the vertical support member as specified, or as shown on drawings.

   3. Utility service outlet accessory fittings, electrical receptacles and switches, as listed in these specifications, equipment schedules or as shown on drawings as mounted on the laboratory furniture, not specified as pre-plumbed or pre-wired, shall be furnished only. The above-defined items shall be furnished with supply tank nipples and lock nuts, loose in boxes and properly marked. These plumbing and electrical fittings will be packaged separately and properly marked for delivery to the appropriate contractor.

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

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

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

B. Related Divisions:
   1. Divisions 5 & 6: Behind-the-Wall Blocking and Studs
   2. Division 9: Base Molding
   3. Division 11: Chemical Fume Hoods
   4. Division 15: Plumbing
   5. Division 16: Electrical Fittings and Connections

C. Related Publications:
   1. SEFA 3 – Scientific Equipment and Furniture Association
   2. SEFA 8 – Scientific Equipment and Furniture Association
   3. NFPA 30 – National Fire Protection Association
   4. NFPA-45 – National Fire Protection Association
   5. UL – Underwriters Laboratories
   6. ASTM D522 – Bending Test

1.01 BASIS OF WORK

A. It is the intent of this specification to use **Enterprise Free Standing Laboratory Workstation System** as the standard of construction for laboratory furniture. The construction standards of this product line shall provide the basis for quality and function.

B. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval from the owner/architect. This approval must be obtained seven (7) days before the quotation deadline. Procedures for obtaining approval for an alternate manufacturer are defined in section 2.00.C in this specification.

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

D. Participants in the quotation process have the option of clarifying deviations to the specified design, construction, or materials. Without such clarifications, sealed quotations to the owner or owner representative will be construed as being in total conformance to the requirements of the specification.

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

1.02 QUALITY ASSURANCE

A. The modular component system laboratory furniture contractor shall also provide work tops and fume hoods **all manufactured or shipped from the same geographic location** to assure proper quality assurances, staging, shipment and single source responsibility.

B. General Performance: Provide certification that furniture shall meet the performance requirements described in SEFA 8.

1.03 SUBMITTALS

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

B. Samples:
Samples from non-specified manufacturers will be required and reviewed per specification. Samples shall be delivered, at no cost to the architect or owner to a destination set forth by the architect or owner. This must be done seven (7) days before quotation deadline as a condition of approval of each bidder. Samples shall be full size, production type samples. Miniature, or "Show Room" type samples are not acceptable. Furnish the following:
1. Complete table structure with shelves and accessories, mobile cabinet and required hardware.
2. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests.
3. Sample of all mechanical service fittings, locks, door pulls, hinges, and interior hardware.

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

PART 2 – PRODUCTS

2.00 MANUFACTURERS

A. The basis of this specification is a modular component system manufactured according to the standards used by **Kewaunee Scientific Corporation**, 2700 Front Street, Statesville, North Carolina. The specified design is ENTERPRISE. All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location in the United States to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Kewaunee Scientific Corporation shall contain a review of the following capabilities:
   1. List of engineering and manufacturing personnel
   2. Proof of financial ability to fulfill the contract
   3. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
   4. Proof of project management and installation capabilities

B. The selected manufacturer must warrant for a period of one-year starting (date of acceptance or occupancy, whichever comes first) that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

C. All manufacturers other than those mentioned in section 2.00.A. must submit samples made in accordance with this specification Section 1.03.B.

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

2.01 MATERIALS

A. General Requirements:
   It is the intent of this specification to provide a high quality adjustable and moveable casework system designed for the laboratory environment. Major structural components are made from high quality cold rolled steel.

B. Sheet Steel:
   Cold rolled sheet steel shall be prime grade; roller leveled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other injurious effects. All gauges shall be U.S. Standard.

C. Glass:
   Glass used for framed sliding and swinging doors shall be 1/8" float glass. Glass used for unframed sliding doors, shall be 1/4" float glass.

2.02 CONSTRUCTION

A. ENTERPRISE Freestanding Workstation system shall be comprised of Work Surface Support Frames adjustable from 31" to 37" AFF, and a Rear Frame Support Structure, single or double sided, incorporating a vertical post and horizontal support. The vertical supports shall incorporate individual slots for adjustable shelving and accessories. The vertical support shall incorporate a chase for plumbing and wiring of services.

   1. Worksurface Support Frame:

a. The frame shall be a welded four sided assembly consisting of 11 gauge steel channel formations, front adjustable height legs, and rear attachment collars. Nominal lengths are 42”, 48”, 60”, 72” and 96”.
b. Adjustable height shall be 31” to 37” AFF including 1” work surface.
c. Front leg members shall be 11 gauge steel tubes, 2” outside diameter and 1.75” inner telescoping leg capable of vertical adjustment in 2” increments.
d. Legs shall include non-marring, 3/8” diameter, levelers.
e. Rear corners shall have 2.25” diameter x 6” high, 11 gauge half-round collars welded to the worksurface frame with supporting gussets and shall be mechanically fastened to the rear upright supports with Button Head Socket Cap Screws.
f. Load rating shall be 100 lbs per linear foot of length to a maximum of 800lbs. With uniformly distributed load, the maximum allowable deflection shall be .125” measured at the center of the front rail.
g. An optional full length horizontal rear cabinet stop shall be located under the work surface frame to position 24” deep mobile base cabinets 1” behind the front edge of the work surface.

2. Double-sided Rear Frame Support Structure:
   a. The rear frame support structure shall be 84” in height and available in nominal lengths of 42”, 48”, 60”, 72”, and 96”.
   b. Rear frame support structures shall consist of two (2) 2” x 6” vertical members, with horizontal framing members.
   c. The vertical members shall be able to accommodate up to three services each and a duplex electrical receptacle or data outlet and shall include removable closure panels for access to service wiring, piping, and fittings.
   d. Each vertical member shall include two (2) non-marring, 3/8” diameter, levelers.
   e. All rear frame support structures in widths of 60” wide and over shall have a center support to accommodate split shelving.
   f. The vertical members shall have shelf/accessory slots punched on 1” increments on the front and back starting at 55” above AFF to top of upright.
   g. Rear frame support structures shall incorporate upper and intermediate horizontal cross rails. The upper cross rail shall provide a utility trough the full length of the table. The intermediate cross rail shall support an integral two channel raceway with removable access panel. The raceway may be specified with electrical & data as required.

3. Single-sided Rear Frame Support Structure:
   a. The rear frame support structure shall be 84” in height and available in nominal lengths of 42”, 48”, 60”, 72”, and 96”.
   b. Rear frame support structures shall consist of two (2) 2” diameter tube vertical members, with horizontal framing members. The vertical members shall allow the installation of service fittings.
   c. The vertical members shall be able to accommodate up to three services each and a duplex electrical receptacle or data outlet.
   d. Vertical members shall include non-marring, 3/8” diameter, levelers.
   e. All rear frame support structures in widths of 60” wide and over shall have a center support to accommodate split shelving.
   f. The vertical members shall have shelf/accessory slots punched on 1” increments on the front starting at 55” above AFF to top of upright.
   g. Rear frame support structures shall incorporate upper and intermediate horizontal cross rails. The intermediate cross rail shall support an integral two channel raceway with removable access panel. The raceway can be specified with electrical & data as required.

4. Enterprise Four Leg Adjustable Table

   a. The Enterprise four leg table shall consist of a worksurface support frame as described above in A.1. Nominal lengths are 42”, 48”, 60”, 72” and 96”. Two additional leg members shall be bolted to the rear attachment collars to provide a four leg self-

supporting table frame., adjustable in height from 31” to 37” AFF including 1” work surface.

b. Front and rear leg members shall be 11 gauge steel tubes, 2” outside diameter and 1.75” inner telescoping leg capable of vertical adjustment in 2” increments
c. Legs shall include non-marring, 3/8” diameter, levelers.
d. Load rating shall be 100lbs per linear foot of length to a maximum of 800lbs. With uniformly distributed load, the maximum allowable deflection shall be .125” measured at the front center rail.

B. Work Surfaces:

Counter tops shall be as indicated on the drawings or as indicated by model number, and all clips, screws and parts for fastening top to table frame and/or cabinet shall be included.

1. Kemresin:
   Kemresin molded epoxy resin tops shall be molded from a modified epoxy resin that has been especially compounded and cured to provide the optimum physical and chemical resistance properties required of a heavy-duty laboratory table top. Tops and curbs shall be a uniform mixture throughout their full thickness, and shall not depend upon a surface coating that is readily removed by chemical and/or physical abuse. Tops and curbs shall be non-glaring, Black, Grey, or Slate in color. Table tops shall be 1" thick, with drip grooves provided on the underside at all exposed edges.

2. Phenolic Resin:
   Phenolic Resin tops shall be available in colors from manufacturer’s standard offering. Tops shall be 1" thick, composed of a cellulose fiber reinforced phenolic resin core with a highly cross linked polyurethane copolymer surface.

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3. High Pressure Laminate:
   High pressure laminate tops and back-splash shall be built up from a 1/16" thick plastic surface (of the color and pattern selected), attached to the substrate with a water resistant adhesive. Substrate shall be of 40-45 lbs. medium density particleboard to make a finished top thickness of 1". All exposed edges shall be self-edge banded unless otherwise specified. Self-edges shall be applied prior to the application of the top sheet and overlapped by the top sheet. All particle board edges and underside of top shall be sealed.

C. Adjustable Shelving

1. Adjustable Shelves for Enterprise tables shall be supported by 11 gauge brackets which mount to the slots in the rear frame support structure. They shall be adjustable in height on 1" increments.

2. Wall Standards for wall mounted shelving shall utilize a 2” diameter tube to match the vertical members of the single-sided rear frame support structure. The slot pattern shall allow for 1” height adjustment.

3. Shelves shall be available in depths of 9", 12", and 15” and nominal lengths of 30”, 36”, 42” and 48” to match the slots on the rear frame support structure.

4. Shelf Materials

   a Steel shelves shall be 16 gauge steel, formed down 1" then returned back and up into a channel formation. They shall attach to the shell brackets without additional hardware or adhesive and shall be installable without tools. Steel shelves are available with a steel retaining lip on the front and/or rear. An optional front retaining rod of 3/8” diameter steel is also available.

b. Wood shelves shall be 1" thick hardwood plywood with Red Oak or Maple veneer on all exposed surfaces. Wood shelves are available with a steel retaining lip on the front and/or rear. An optional front retaining rod of 3/8” diameter steel is also available.

c. Phenolic Resin shelves shall be 1" thick phenolic resin. Phenolic Resin shelves are available with a steel retaining lip on the front and/or rear. An optional front retaining rod of 3/8” diameter steel is also available.

D. Casework:
Casework for the Enterprise freestanding laboratory casework system shall include floor mounted, mobile, and add-a-drawer styles.
Cabinet shall be:

SELECT ONE FROM THE FOLLOWING: (Refer to the Kewaunee Scientific Master Specifications for complete specification information for each casework option):

1. Steel Casework (Research Collection):

Style-01
Style 01 casework shall be flush face construction, with doors and drawer fronts in the same plane as the cabinet face frame, without overlap. The doors and drawer fronts shall be 3/4" thick, square edged, and offer a variety of attached pulls. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body and a 150 lb. self-closing drawer guide.

----- or -----

Style-02
Style 2 casework shall be flush face construction, with doors and drawer fronts in the same plane as the cabinet face frame, without overlap. The doors and drawer fronts shall be 3/4" thick, square edged, with a satin finished recessed aluminum pull. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body and a 150 lb. self closing drawer guide.

----- or -----

Style-11
Style 11 casework shall be full overlay construction, with doors and drawer fronts overlapping the cabinet face frame. The doors and drawer fronts shall be 3/4" thick, square edged and offer a variety of attached pulls. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body and a 150 lb. self closing drawer guide.

----- or -----

Style-12
Style 12 casework shall be full overlay construction, with doors and drawer fronts overlapping the cabinet face frame. The doors and drawer fronts shall be 3/4" thick, square edged with a satin finished recessed aluminum pull. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body and a 150 lb. self closing drawer guide.

----- or -----

Style-14
Style 14 casework shall be full overlay construction, with doors and drawer fronts overlapping the cabinet face frame. The doors and drawer fronts shall be 3/4" thick, with radiused horizontal top and bottom edges and offer a variety of attached pulls. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive

door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body, and a 150 lb. self closing drawer guide.

----- or -----

Style-15

Style 15 casework shall be full overlay construction, with doors and drawer fronts overlapping the cabinet face frame. The doors and drawer fronts shall be 3/4" thick, with radiused horizontal top and bottom edges with a satin finished recessed aluminum pull. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body and a 150 lb. self closing drawer guide.

----- or -----

Style-16

Style 16 casework shall be full overlay construction, with matching vertical grain wood doors and drawer fronts overlapping the cabinet face frame. The doors and drawer fronts shall be 3/4" thick, and offer a variety of attached pulls. A 5-knuckle stainless steel hinge shall be used for swinging doors, along with a positive door latching mechanism to prevent rebounding. Roller catches are not acceptable. The drawer shall have a one piece body and a 150 lb. self closing drawer guide.

2. Wood Casework (Signature Series):

Style-1 – Red Oak or White Maple

Style-1 conventional radius lip construction shall be a semi-overlay construction with radiused edge door and drawer fronts routed to partially overlap the cabinet face frame. Grain shall be horizontal on drawer fronts and vertical on doors. A variety of pull options shall be available.The hinge shall be 5-knuckle stainless steel. The drawer shall use a dovetail birch plywood construction with a full-extension ball bearing slide.

----- or -----

Style-3 – Red Oak Only

Style-3 construction shall be a full overlay construction with 3/4" thick, radiused edge door and drawer fronts overlapping the cabinet face. The drawer fronts shall be solid hardwood. Pulls shall be created by a full length lipped horizontal shape routed into the door and drawer front. Grain shall be horizontal on drawer fronts and vertical on doors. The hinge shall be 5-knuckle stainless steel. The drawer shall use a dovetail birch plywood construction with a full-extension ball bearing slide.

----- or -----

Style-5 – Red Oak or White Maple

Style-5 full overlay style shall be a full overlay construction with minimal reveal. The 3/4" square edged door and drawer fronts shall overlap the cabinet face frame creating nominal 1/8" reveals between doors and drawers and at cabinet ends. Grain shall be vertical on drawer fronts and doors and shall match across the face of the cabinet. A variety of pull options shall be available. The hinge is 5 knuckle stainless steel. The drawer shall use a dovetail birch plywood construction with a full-extension ball bearing slide.

2.03 Finish and Performance Requirements

A. Steel Paint System Finish and Performance Specification:

1. Steel Paint System Finish:
   After the component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.

   After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance.

   The completed finish system in standard colors shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

   Performance Test Results (Chemical Spot Tests):

   a. Testing Procedure:
      Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77° ±3° F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

   a. Test Evaluation:
      Evaluation shall be based on the following rating system.

      Level 0 – No detectable change.
      Level 1 – Slight change in color or gloss.
      Level 2 – Slight surface etching or severe staining.
      Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

      After testing, panel shall show no more than three (3) Level 3 conditions.

   b. Test Reagents

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	Cotton ball & bottle
2.	Acetate, Ethyl	Cotton ball & bottle
3.	Acetic Acid, 98%	Watch glass
4.	Acetone	Cotton ball & bottle
5.	Acid Dichromate, 5%	Watch glass
6.	Alcohol, Butyl	Cotton ball & bottle

7.	Alcohol, Ethyl	Cotton ball & bottle
8.	Alcohol, Methyl	Cotton ball & bottle
9.	Ammonium Hydroxide, 28%	Watch glass
10.	Benzene	Cotton ball & bottle
11.	Carbon Tetrachloride	Cotton ball & bottle
12.	Chloroform	Cotton ball & bottle
13.	Chromic Acid, 60%	Watch glass
14.	Cresol	Cotton ball & bottle
15.	Dichlor Acetic Acid	Cotton ball & bottle
16.	Dimethylformanide	Cotton ball & bottle
17.	Dioxane	Cotton ball & bottle
18.	Ethyl Ether	Cotton ball & bottle
19.	Formaldehyde, 37%	Cotton ball & bottle
20.	Formic Acid, 90%	Watch glass
21.	Furfural	Cotton ball & bottle
22.	Gasoline	Cotton ball & bottle
23.	Hydrochloric Acid, 37%	Watch glass
24.	Hydrofluoric Acid, 48%	Watch glass
25.	Hydrogen Peroxide, 3%	Watch glass
26.	Iodine, Tincture of	Watch glass
27.	Methyl Ethyl Ketone	Cotton ball & bottle
28.	Methylene Cloride	Cotton ball & bottle
29.	Mono Chlorobenzene	Cotton ball & bottle
30.	Naphthalene	Cotton ball & bottle
31.	Nitric Acid, 20%	Watch glass
32.	Nitric Acid, 30%	Watch glass
33.	Nitric Acid, 70%	Watch glass
34.	Phenol, 90%	Cotton ball & bottle
35.	Phosphoric Acid, 85%	Watch glass
36.	Silver Nitrate, Saturated	Watch glass
37.	Sodium Hydroxide, 10%	Watch glass
38.	Sodium Hydroxide, 20%	Watch glass
39.	Sodium Hydroxide, 40%	Watch glass
40.	Sodium Hydroxide, Flake	Watch glass
41.	Sodium Sulfide, Saturated	Watch glass
42.	Sulfuric Acid, 33%	Watch glass
43.	Sulfuric Acid, 77%	Watch glass
44.	Sulfuric Acid, 96%	Watch glass
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	Watch glass
46.	Toluene	Cotton ball & bottle
47.	Trichloroethylene	Cotton ball & bottle
48.	Xylene	Cotton ball & bottle
49.	Zinc Chloride, Saturated	Watch glass

* Where concentrations are indicated, percentages are by weight.

c. Performance Test Results (Heat Resistance):
Hot water (190° F - 205° F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.

d. Performance Test Results (Impact Resistance):
A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.

e. Performance Test Results (Bending Test):
An 18 gauge steel strip, finished as specified, when bent 180^{o} over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.

f. Performance Test Results (Adhesion):
Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".

g. Performance Test Results (Hardness):
The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the softest).

The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is, the hardest pencil that will not rupture the film, is then used to express or designate the hardness.

2.04 SINKS, CUPSINKS, AND DRAIN TROUGHS

A. SINKS:
(Choose one or more from SINKS, CUPSINKS, and DRAIN specification)

1. Molded Epoxy Resin Sinks (Kemresin)
2. Stainless Steel Sinks

B. CUPSINKS
(Choose one or more from SINKS, CUPSINKS, and DRAIN specifications)

1. Molded Epoxy Resin Cupsinks (Kemresin)
2. Polyethylene Cupsinks:

C. DRAIN TROUGHS
(Import information from SINKS, CUPSINKS, and DRAIN specifications)

2.05 FITTINGS

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

B. Construction (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec):
1. Valves:
   a. Water
   b. Steam
   c. Distilled Water
   d. Ground key dry service

e. Needle valve dry service
e. Outlets
f. Goosenecks
g. Aerator outlets
h. Tank nipples
i. Sink outlets
j. Electrical Fittings
k. Miscellaneous
l. Crumb cup strainers
m. Vacuum breakers

C. Performance (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec):
1. Laboratory ball valves
a. Needle point cocks
b. Vacuum valve
c. Water (H&C) valve
d. Steam valve

PART 3 - EXECUTION - LABORATORY CASEWORK AND RELATED PRODUCTS

3.00 SITE EXAMINATION

A. The owner and/or his representative shall assure all building conditions conducive to the installation of a finished goods product; all critical dimensions and conditions previously checked have been adhered to by other contractors (general, mechanical, electrical, etc.) to assure a quality installation.

3.01 INSTALLATION

A. Preparation:
Prior to beginning installation of casework, check and verify that no irregularities exist that would affect quality of execution of work specified.

B. Coordination:
Coordinate the work of the Section with the schedule and other requirements of other work being prepared in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.

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

2. Worksurfaces:
a. Where required due to field conditions, scribe to abutting surfaces.
b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure the joints in the field, where practical, in the same manner as in the factory.
c. Secure worksurfaces to casework and equipment components with materials and procedures recommended by the manufacturer.

D. Adjust and Clean:
   1. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.

   2. Adjust doors, drawers and other moving or operating parts to function smoothly.

   3. Clean shop finished casework; touch up as required.

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

   5. Casework to be left broom clean and orderly.

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

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