

SECTION 12345.1

STEEL LABORATORY CASEWORK P & S SERIES

PART 1 GENERAL

1.00 SUMMARY

A. Section Includes:

1. Steel Casework – Painted and Stainless Steel
2. Work Surfaces
3. Table Frames
4. Sinks
5. Special Purpose Storage Cabinets

B. Related sections:

1. Section 11610.1 through 11610.3 – Laboratory Fume Hoods
2. Section 12345.2 – Flush Overlay Steel Laboratory Casework
3. Section 12345.3 – Flexible Laboratory Systems

1.01 CASEWORK DESIGN REQUIREMENTS

A. Flush Inset construction: Surfaces of doors, drawers and panel faces shall align with cabinet fronts without overlap of case ends, top or bottom rails. Horizontal and vertical case shell members (panels, tops rails and bottoms) shall meet in the same plane without overlap.

B. Interior of case units: Easily cleanable, flush interior. Base cabinets, 30" and wider, with double swinging doors shall provide full access to complete interior without center vertical post.

C. Self-supporting units: Completely welded shell assembly without applied panels at ends, backs or bottoms, so that cases can be used interchangeably or as a single, stand-alone unit.

D. Case openings: Rabbeted-like joints all four sides of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.

E. Drawers: Sized on a modular basis for interchangeability to meet varying storage needs, and designed to be easily removable in the field without use of special tools.

F. Doors: Solid or glazed, double wall telescoping box steel construction, interior sound deadening, removable hinges standard.

1.02 CASEWORK PERFORMANCE REQUIREMENTS

A. Structural Performance Requirements: Casework components shall withstand the following maximum static load capacity, without damage to the component or to the casework operation, when properly leveled, supported and the load evenly distributed:

- | | |
|-------------------------------------|--------------------------------|
| 1. Steel base units: | 500 lbs. per lineal ft. |
| 2. Suspended units: | 300 lbs. |
| 3. Drawers in a cabinet: | 150 lbs. per drawer |
| 4. Utility tables (4 legged): | 300 lbs. |
| 5. Hanging wall cases: | 300 lbs. |
| 6. Shelves (base, wall, tall units) | 40 lbs./sq.ft., up to 200 lbs. |

B. Metal Finish Performance Requirements: Coatings on Casework components have been tested in conformance with the full requirements of SEFA 8 M-2007 Recommended Practice. See Section 2.07 for test procedures, acceptance levels and results for each criteria listed below from SEFA 8 M-2007 Section 10:

1. Chemical Spot Test – Section 10.1
2. Hot Water Test – Section 10.2
3. Finish Impact Test – Section 10.3
4. Paint Adhesion on Steel – Section 10.4
5. Paint Hardness on Steel – Section 10.5

1.03 WORK SURFACE PERFORMANCE REQUIREMENTS

The following are epoxy work surface performance requirements which the Specifier may wish to select.

A. Epoxy Work Surface Performance Requirements:

1. Test procedure: Apply five drops of each reagent to surface and cover with 25mm watch glass, convex side down; test volatiles using one ounce bottle stuffed with saturated cotton. After 1 hour exposure flush surface, clean, rinse and wipe dry. Evaluate after 24 hours at 73°F, and 50°F at 5% relative humidity.
2. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:
 - a. No Effect: No detectable change in surface material.
 - b. Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.
 - c. Good: Clearly discernible change in color or gloss, but no significant impairment of work surface function or life.
 - d. Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
 - e. Failure: Pitting, cratering or erosion of work surface material; obvious and significant deterioration.
3. Test Results - Epoxy Resin Work Surface:

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Laboratory Planning Solutions

visit www.HEMCOcorp.com

Tel (816) 796-2900
Fax (816) 796-3333
info@HEMCOcorp.com

HEMCO Corporation
711 South Powell Road
Independence, MO 64056 USA

	<u>REAGENT</u>	<u>RATING</u>
1.	Hydrochloric Acid, 37%	Excellent
2.	Sulfuric Acid, 33%	No Effect
3.	Sulfuric Acid, 77%	No Effect
4.	Sulfuric Acid, 96%	Failure
5.	Formic Acid, 90%	Excellent
6.	Nitric Acid, 20%	Excellent
7.	Nitric Acid, 30%	Excellent
8.	Nitric Acid, 70%	Good
9.	Hydrofluoric Acid, 48%	Fair
10.	Phosphoric Acid, 85%	No Effect
11.	Chromic Acid , 60%	Failure
12.	Acetic Acid, 98%	Excellent
13.	3 & 8 Equal Parts	Excellent
14.	Ammonium Hydroxide, 28%	No Effect
15.	Sodium Hydroxide, 10%	No Effect
16.	Sodium Hydroxide, 20%	No Effect
17.	Sodium Hydroxide, 40%	No Effect
18.	Sodium Hydroxide Flake	No Effect
19.	Sodium Sulfide	Excellent
20.	Zinc Chloride	No Effect
21.	Tincture of Iodine	Excellent
22.	Silver Nitrate	No Effect
23.	Methyl Alcohol	No Effect
24.	Ethyl Alcohol	No Effect
25.	Butyl Alcohol	No Effect
26.	Benzene	Excellent
27.	Xylene	No Effect
28.	Toluene	Excellent
29.	Gasoline	No Effect
30.	Dichlor Acetic Acid	Good
31.	Di Methyl Formamide	Excellent
32.	Ethyl Acetate	No Effect
33.	Amyl Acetate	Excellent
34.	Acetone	Excellent
35.	Chloroform	Excellent
36.	Carbon Tetrachloride	No Effect
37.	Phenol	Excellent
38.	Cresol	Excellent
39.	Formaldehyde	No Effect
40.	Trichlorethylene	Excellent
41.	Ethyl Ether	Excellent
42.	Furfural	Good
43.	Methylene Chloride	Excellent
44.	Mono Chlor Benzene	Good
45.	Dioxane	Excellent
46.	Methyl Ethyl Ketone	Excellent
47.	Acid Dichromate	Fair
48.	Hydrogen Peroxide	No Effect
49.	Naphthalene	Excellent

PART 2 PRODUCTS

2.00 MANUFACTURER

A. Casework and related equipment designed and manufactured by: HEMCO Corporation 711 South Powell Road, Independence, Mo 64056.

2.01 MATERIALS

A. Typical sheet steel used in the construction of cases and related products:

1. Mild carbon, cold rolled and leveled unfinished steel, ASTM A 1008
2. Stainless steel, #4 finish one side, ASTM A 666
3. Mild carbon, cold rolled and hot dipped galvanized steel

B. Unless otherwise noted, the typical gauge of steel used in the construction of cases and related products shall be 18 GA. Exceptions listed below:

1. 11 GA – table leg stretcher and leg rail support brackets
2. 12 GA – bottom corner gussets
3. 14 GA – hinge reinforcements, suspension channels
4. 16 GA – table cross rails, apron rails and end rails
5. 20 GA – inner door panels, filler stiles, fixed back panels, drawer bodies
6. 22 GA – removable back panels

C. Glass for glazed swinging, sliding and frameless doors as follows:

1. 1/4" Clear Float Glass – standard for swinging & sliding doors
2. 1/4" Tempered Glass per ASTM C 1048 – standard for frameless doors
3. 1/4" Laminated Glass per ASTM C 1172 – optional

2.02 CASEWORK CONSTRUCTION

A. Base and Tall Cabinets (standard 22" nominal depth):

1. Minimum height, including corner gussets, leveler fully retracted:
 - a. Base Standing 35.500"
 - b. Base Sitting 28.250"
 - c. Base ADA 31.853"
 - d. Tall 83.750"
2. One-piece formed end panels and back with internal reinforcing front posts
3. Front post fully closed with full height reinforcing upright.
4. Shelf adjustment holes in front and rear posts shall be perfectly aligned for level setting, adjustable to 1/2" increments.
5. Base cabinet drawer units provided without backs or bottoms; cupboard units provided with removable backs for service access.
6. Tall cabinet units provided with full formed backs, recessed 1/8" for mounting purposes.
7. One-piece bottom with formed front edge spot welded to front rail. Rabbeted as required for swinging doors and drawers; flush for sliding doors.

8. Top rail interlocks with and welded to end panels, flush with front of unit; reinforced for suspended units.

9. Formed steel base provides minimum 3.750" high by 3.000" deep toe-kick space; reinforcing corner gussets accommodate standard 1/2-13 UNC x 2.500" zinc plated leveling bolt, accessible through bottom panel on Base and Tall Cabinets where applied.

B. Wall Cabinets (standard 12" and 16" depth):

1. Standard heights include 18", 24.5", 30", 36", 42" and 48".

2. One piece formed end panels and back with internal reinforcing front posts.

3. Front post fully closed with full height reinforcing upright.

4. Shelf adjustment holes in front and rear posts shall be perfectly aligned for level setting, adjustable to 1/2" increments.

5. One-piece formed back, recessed 3/4" for mounting purposes.

6. One-piece top with front edge formed into front rail.

7. One-piece bottom with front edge formed into front rail.

8. Note: All exposed seams on joints will be welded, ground and polished to an equivalent mill finish.

C. Drawers:

1. Drawer fronts: 5/8" thick, double wall construction, assembled with sound deadened material, top front corners fitted smooth.

2. Drawer bodies: Stainless steel one piece construction with bottom and sides coved and top edges formed; no sharp edges.

3. No tools required for removal.

4. Drawer suspension: Removable full extension plus Accuride (or equivalent) slide; rated 150 lb. static, 100 lb. dynamic.

5. Provide drawer with rubber bumpers. Friction centering devices are not acceptable.

6. Provide security panels for drawers with keyed different locks (as required).

D. Doors:

1. Solid panel doors: 5/8" thick, double wall, telescoping box steel construction with interior sound deadening, outer corners fitted smooth. Hinges with screws to internal 14 gauge reinforcement in case and door. Hinges shall be removable; welding of hinges not acceptable. Doors shall close against rubber bumpers.

2. Frame glazed doors: Outer head to be one-piece construction with beaded edges. Inner head shall be one-piece construction also, telescoping, and secured with screws to outer head; removable for installation or replacement of glass. Provide vinyl glazing retainer to receive glass. In all other respects, framed glazed door construction and quality shall match solid panel doors.

3. Sliding doors - solid or framed glazed: Designed for tilt-out removal. Doors shall ride on nylon tired sleeve bearing rollers in aluminum extended bottom hung track and shall close against rubber bumpers.

4. Unframed sliding glass doors: Glass with edges ground set in extruded aluminum shoe with integral pull (top and bottom extruded aluminum track). Provide rubber bumpers at fully opened and closed door position.

E. Shelves:

1. Casework shelves: Die formed steel, front and back edges formed down and back 1"; ends formed down 3/4".
2. Reinforced shelves: Shelves over 36" long and 16" deep include hat channel reinforcement, full length of the shelf.
3. Pull out shelves: Same suspension as specified for drawers.

F. Base molding: 4" high typical, to be furnished and installed by others.

G. Hardware:

1. Wire pulls: Modern design, offering a comfortable hand grip, and be securely fastened to doors and drawers. Two pulls shall be required on all drawers 30" and longer.
2. Flush pulls: Modern design, made of plastic or die cast metal (Specifier's Option), providing a semi-recessed appearance and comfortable finger grip. Finger holes or slots machined into doors are not acceptable.
3. Hinges: Brushed stainless steel type, 5-knuckle, frictionless, not less than 2" long with fast pin and rounded ends. Hinges are attached to both door and case with three (3) screws through each leaf. Doors over 36" in height shall be hung using 3 hinges.
4. Removable Core Locks: 5-disc tumbler standard, 5-pin tumbler optional (Specifier's Option) applied to doors and drawers where specifically requested in the specifications or on the equipment list, and shall be keyed and master-keyed as directed.
5. Door Catches: Adjustable nylon roller type, with strike.
6. Leveling Devices: Zinc plated 1/2"-13 UNC threaded bolt type.
7. Shelf Clips: Die formed steel, zinc plated, designed to provide shelf support and adjustment in 1/2" increments
8. Label Holders: Applied (in the field) to doors and drawers where specifically requested in the specifications or on the equipment list, shall be self adhesive type aluminum with satin finish and designed for 2-1/2" x 1-1/8" cards, unless otherwise specified.
9. Up-and-Down Bolts: Optional on hinged full height storage cases, they shall have a right hand door provided with an active knob and up-and-down bolt assembly. Left hand door shall be provided with a dummy knob. Up-and-down bolts shall be concealed in the stiles of glazed doors and between pans of solid panel doors.

2.03 WORK SURFACES (Specifier's Option – choose one):

A. Stainless Steel: Stainless steel tops and working surfaces shall be Type 304 with #4 finish per ASTM A 666, unless otherwise specified. All exposed surfaces shall be 16 gauge stainless steel reinforced on the underside by 16 gauge galvanized steel channels, so spaced as to prevent twisting, oil-canning or buckling. Exposed edges of tops shall be formed into a 1-1/4" channel shape. Splash rails and curbs shall be formed from the same sheet as the top or welded to provide a seamless appearance. Top edges of curbs and backsplash shall be formed into a channel shape. Where stainless steel

sinks are included in the work surface, the sink bowl shall be so welded to the top as to form an integral part thereof. All welds shall be ground smooth and polished to a uniform satin finish over the entire top and sink assembly. Soldering of the sinks, curbs or splash rails to the top shall not be permitted. Mechanical joints or field joints, where made necessary by size, shall be a tight butt joint of the top surfaces, reinforced and held in alignment with steel reinforcements. Underside of tops and sinks shall be spray coated with a sound dampening material.

B. Epoxy Resin: Chemical and abrasion resistant, durable 1" thick cast material of epoxy resins and inert products, cast flat, with a uniform low-sheen black surface. Backsplash curb shall be the same material as the top, but provided separate for field installation. Provide where indicated on drawings or as required where tops abut wall surfaces and at reagent ledges. Include end curb where top abuts end wall as specified. Reagent ledges shall be the same material as the top. Ledge face shall permit installation of service fixtures and top shall be removable for access to service utilities.

C. Wood:

1. Maple Wood Tops (ACID-Resistant): Shall be 1" thick and built up of maple strips, finger joint construction using urea resin glue and electronically cured. All tops shall have a 1/4" wide by 1/8" deep drip groove on underside and all exposed top edges and corners shall be radiused 1/4". Finish shall consist of a polymerized resin coated evenly applied to all surfaces, baked between coatings, with a final baking at 145 degrees F. The result shall be an acid, alkali and solvent resistant surface, uniformly ebony black in appearance.

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

3. Plastic Surfaced Tops: Plastic surfaced tops and back-splash shall be built up to a 1/16" thick plastic surface (of the color and pattern selected), attached to the sub-top with a water resistant adhesive. Substrate shall be of 40-45 lbs. medium density 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.

2.04 TABLE FRAMES

A. Table frames: 4-1/2" high "C" channel front and back aprons, end rails and cross rails.

B. Table drawers: Provide front and back rails; drawer unit, hardware and suspension same as specified for base unit drawers.

C. Legs: 2" x 2" steel tube legs with welded 11 GA leg bracket. Attach legs with two bolts to front and back aprons and weld to end rails. Each leg shall have a recessed leveling screw.

D. Leg Shoes: Provided on all table legs to conceal leveling device, unless otherwise specified. Shoes shall be pliable, black vinyl material.

2.05 SINKS

A. Stainless Steel Sinks: Shall be fabricated from Type 304 stainless steel per ASTM A 666, except where Type 316 stainless steel is specified. All expose surfaces shall be finished in No. 4 finish. All sink surfaces (sides and bottoms) shall be full 16 gauge metal thickness unless heavier gauges are specified. Deep drawn sinks are not acceptable. All sink joints shall be continuously welded by heliarc welding process. Inside radii shall be 1". Bottoms shall be pitched to the drain indent. Sink bowl shall be welded to the top as to form an integral part thereof where sinks are built into stainless steel tops or working surfaces. Top edges of free standing sinks shall be formed into a channel formation with all joints welded and ground smooth and polished. No soldering shall be permitted in connection with sink construction. Stainless steel sinks shall be furnished with crumb cup strainers unless otherwise specified.

B. Sink Supports: Sink supports shall be the hanger type, suspended from top front and top rear horizontal rails of sink cabinet by four (4) 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full length reinforcements welded to the front and rear top rails. Two 3/4" x 1-1/2" gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks. When sink capacity exceeds 3,750 cu. in., the sink supports shall be suspended from full length reinforcements welded to the two end rails. Two 1" x 2" x 10 gauge full length channels shall be hung from the four 1/4 " dia. rods to provide an alternate sink cradle

2.06 SPECIAL PURPOSE STORAGE CABINETS

A. Acid/Corrosive Storage Cabinets: Shall employ the same materials, hardware and construction methods as standard base and tall cabinets with the following exceptions:

1. Case:

a. Double-walled 18 GA steel (back and sides), provides internal backing surface for corrosion resistant inner liner.

b. Perforated at rear for use of venting apparatus; no penetration of liner at vent opening.

2. Liner: One-piece welded polypropylene, secured to case with nylon screws. Includes 1" lip along at door opening for spill containment.

3. Doors: Polypropylene lined with louvers for ventilation; locks optional as defined by specifier.

4. Shelves: Half-depth, 0.75" thick polypropylene with 1" high lip welded along front edge, adjustable (two levels).

5. Casters: For mobile applications, swivel type; locking casters optional.

6. Labels: "ACID" or "CORROSIVE" shall be silk-screened onto the door. "ACID" appears as red lettering on blue background; "CORROSIVE" as black lettering on white background.

B. Flammable Storage Cabinets: The following requirements cover cabinets intended to be used to provide a storage area for limited quantities of flammable and combustible liquids stored in containers in compliance with ANSI/NFPA 30. Construction and performance requirements for these cabinets are primarily based on ANSI/NFPA 30. A storage cabinet may have a maximum total storage capacity of not more than 120 gallons of Class I, Class II or Class IIIA flammable and combustible liquids. Of this total, not more than 60 gallons shall be of Class I or Class II liquids, or a combination thereof. No more than three cabinets shall be permitted to be located in the same fire area. In addition, all standard cabinets shall be constructed, tested and listed in accordance with UL 1275 "Standards for Flammable Liquid Storage Cabinets". All UL 1275 approved cabinets will bear a label from the manufacturer stating such, including the company name, model number, and cabinet capacity.

Flammable Storage Cabinets shall employ the same materials, hardware and construction methods as standard base and tall cabinets with the following exceptions:

1. Case:

- a. Double-walled 18 GA steel with 1-1/2" air space between panels on top, bottom, sides, back and door.
- b. Air spaces shall be filled with a 1" thick blanket of High-Temp Fiberglass.
- c. Perforated at rear for use of venting apparatus. Note: If cabinet is vented for whatever reason, it shall be vented outdoors in such a manner that will not compromise the specified performance of the cabinet, and be acceptable to the authority having jurisdiction over this matter. If the cabinet is not vented, the vent openings shall be sealed with plugs provided by the manufacturer.
- d. Bottom Floor Pan shall provide a 2" deep liquid tight pan to contain liquid spills and prevent leaks.
- e. Provisions for attaching grounding wire at the base of the cabinet on the outside.

2. Doors:

- a. Provided with a three-point locking mechanism (Up-and-Down bolt type).
 - b. Three-point slam latch optional.
 - c. Self-closing mechanism and fusible link shall also be incorporated (optional with slam latch version only).
 - d. Provided with full length stainless steel piano hinge.
3. Mobile: With four casters (2-locking), swivel-type. Vent holes factory plugged. Cabinets shall be ADA compliant for height, width and load capacity.
4. Labels: "FLAMMABLE – KEEP FIRE AWAY" shall be silk-screened onto the door, appearing as red lettering on a bright yellow background.

C. Vacuum Pump Storage Cabinets: Shall employ the same materials, hardware and construction methods as standard base cabinets with the following exceptions:

1. Case:

- a. Shall include acoustical insulation on the interior of the cabinet for noise absorption, rated for flammability to UL94 HF-1.
- b. Bottomless, to facilitate movement of the mobile pump caddy in and out of the cabinet.
- c. Removable back for access to services behind cabinet
- d. Perforated at rear for use of venting apparatus.

2. Doors:

- a. Hinged doors with integral toe space.
- b. Includes acoustical insulation affixed to door inner panel, rated for flammability to UL94 HF-1.

3. Mobile Pump Caddy:

- a. 14 GA steel platform with four integral lips and welded in each corner to safely contain any accidental spills.
- b. Includes casters, swivel type; locking casters optional.
- c. Shall have a maximum load capacity of 300 lb.

4. Additional Features:

- a. Shall incorporate an integral electrical switch (120V, 20 amp) with pilot light to indicate the operational mode of the vacuum pump unit.
- b. Shall include an electrical duplex, located in the rear of the cabinet, for the vacuum pump plug end. Outlet is to be accessible from the inside of the cabinet and be hard wired to the electrical switch.
- c. Optional exhaust fan can be employed for greater heat loads or as specified. The exhaust fan assembly will be attached to the exterior of the cabinet and incorporate a 4' diameter duct collar connection. Note: connection by others.

2.07 METAL FINISH (Painted Series)

A. Preparation: Metal shall be treated with a heated alkaline based acid solution, rinsed with water, and a coat of epoxy-link applied; immediately dried in heated ovens, then gradually cool prior to application of finish.

B. Application: Electrostatically apply epoxy 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 thicknesses:

1. Exterior and interior surfaces exposed to view: 1.8 – 3 mils.
2. Backs of cabinets and other surfaces not exposed to view: 1.8 mils minimum.

C. Chemical Spot Test :

1. Test procedure: Place test panel on a flat surface, clean with soap and water and blot dry. Condition the test panel for 48 hours at 73°F ± 3°F and 50% ± 5% relative humidity. Panel will be subjected to chemical reagents according to SEFA 8 M-2007 Recommended Practice using one of the following two test methods:

a. Method A – Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a 1-oz. bottle and inverting the bottle on the surface of the panel.

b. Method B – Test non-volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24 mm watch glass, convex side down.

c. For both test 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°F ± 3°F and 50% ± 5% relative humidity using the following rating system.

2. Evaluation ratings:

a. Level 0 – No detectable change.

b. Level 1 – Slight change in color or gloss.

c. Level 2 – Slight surface etching or severe staining.

d. Level 3 – Pitting, cratering, swelling, or erosion of coating.

Obvious and significant deterioration.

3. Acceptance level: No more than four (4) level 3 conditions, and the sum of all ratings not to exceed twelve (12).

4. Test results: Zero level 3 conditions exist, and sum of all ratings is ten (10). See data below.

<u>REAGENT</u>	<u>METHOD</u>	<u>RATING</u>
Acetate, Amyl	A	0
Acetate, Ethyl	A	0
Acetic Acid, 98%	B	0
Acetone	A	0
Acid Dichromate, 5%	B	0
Alcohol, Butyl	A	0
Alcohol, Ethyl	A	0
Alcohol, Methyl	A	0
Ammonium Hydroxide, 28%	B	0
Benzene	A	0
Carbon Tetrachloride	A	0
Chloroform	A	0
Chromic Acid, 60%	B	0
Cresol	A	1
Dichlor Acetic Acid	A	0
Dimethylformamide	A	0
Dioxane	A	0
Ethyl Ether	A	0

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Laboratory Planning Solutions

HEMCO Corporation
711 South Powell Road
Independence, MO 64056 USA

visit www.HEMCOcorp.com

Tel (816) 796-2900
Fax (816) 796-3333
info@HEMCOcorp.com

Formaldehyde, 37%	A	0
Formic Acid, 90%	B	0
Furfural	A	0
Gasoline	A	0
Hydrochloric Acid, 37%	B	0
Hydrofluoric Acid, 48%	B	1
Hydrogen Peroxide, 28%	B	0
Iodine, Tincture of	B	2
Methyl Ethyl Ketone	A	0
Methylene Chloride	A	0
Mono Chlorobenzene	A	0
Naphthalene	A	0
Nitric Acid, 20%	B	0
Nitric Acid, 30%	B	0
Nitric Acid, 70%	B	2
Phenol, 90%	A	0
Phosphoric Acid, 85%	B	0
Silver Nitrate, Saturated	B	0
Sodium Hydroxide, 10%	B	0
Sodium Hydroxide, 20%	B	0
Sodium Hydroxide, 40%	B	0
Sodium Hydroxide, Flake	B	0
Sodium Sulfide, Saturated	B	0
Sulfuric Acid, 25%	B	0
Sulfuric Acid, 77%	B	0
Sulfuric Acid, 96%	B	2
Sulfuric Acid (77%) & Nitric Acid (70%), (equal parts)	B	2
Toluene	A	0
Trichloroethylene	A	0
Xylene	A	0
Zinc Chloride, Saturated	B	0

D. Hot Water Test

1. Test procedure: Hot water ($100^{\circ}\text{C}\pm 3\%$) shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces [177.44cc] per minute) on a finished surface, which shall be set at an angle of 45-degrees, for a period of five minutes.
2. Acceptance level: After cooling and wiping dry, the finish shall show no visible effects from the hot water.
3. Test results: The finish shows no visible effect due to the hot water.

E. Finish Impact Test:

1. Test procedure: Position the 18 GA CRS test panel with nominal paint thickness of 3 mils on a smooth concrete floor. A one-pound ball (approximately 2" in diameter) shall be dropped from a distance of 12" onto a flat horizontal surface.
2. Acceptance level: There shall be no visual evidence to the naked eye of cracks or checks in the finish due to impact.
3. Test results: There is no visual evidence of any cracks or checks due to impact.

F. Paint Adhesion on Steel:

1. Test procedure: Two sets of six parallel lines 2mm apart shall be cut with a razor blade to intersect at right angles thus forming a grid of 25 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. Brush the grid area lightly with a soft brush, and then place a piece of tape over the grid. Rub the tape firmly with the eraser of a pencil to ensure good contact. Remove the tape by rapidly pulling it back upon itself as close to an angle of 180° as possible.
2. Acceptance level: A 4B rating or better (ninety-five percent or more of the grid area shall show finish intact).
3. Test results: 100% of the squares remained intact after the test.

G. Paint Hardness on Steel:

1. Test procedure: Clip a corner of the sample at 45° exposing a raw metal edge. Place the sample on a raw metal base plate so that the exposed metal edge of the sample makes contact with the turned up side of the base plate. Remove approximately 6mm of wood from a 4H pencil, being careful to leave an undisturbed smooth cylinder of lead. Holding the pencil at an angle of 90° to an abrasive paper, rub the lead against the paper maintaining an exact angle of 90° section until a flat smooth and circular cross section is obtained. On the other end of the pencil remove approximately 13mm of wood from on half of the pencil. Install the pencil into a Sheen model 720N Pencil Scratch Hardness Tester. Follow the manufacturer's instructions for conducting the test.
2. Acceptance level: The paint finish shall withstand the abrasion of a 4H pencil without penetrating through to the substrate and completing a continuous circuit.
3. Test results: The 4H pencil did not penetrate the substrate during the test.

H. Note: manufacturer shall provide independent certified test report on chemical resistance of finish if requested.

2.08 QUALITY ASSURANCE

A. Single source responsibility: Casework, work surfaces, laboratory fume hoods, 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 workmen 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. Ten installations of equal or larger size and requirements.

C. Installer's qualifications: Factory trained and/or certified by the manufacturer.

D. Cabinet identification: Cabinets are identified on drawings by manufacturer's catalog numbers. Unless otherwise modified on drawings or in specifications, catalog description constitutes specific requirements for each type of cabinet.

PART 3 EXECUTION

3.00 INSTALLATION - REFER TO INSTRUCTION AND INSTALLATION MANUAL

A. Casework installation:

1. Set casework components plumb, square, and straight with no distortion and securely anchored to building structure. Shim as necessary using concealed shims.
2. Bolt continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16" tolerance.
3. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.
4. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8" between top units.
5. Remove and discard shipping clip and associated screws from top of shelf, (thin galvanized angle) install 4 shelf clips into integral standard and set shelf. Check for level and adjust clips as required.

B. Work surface installation:

1. Where required due to field conditions, scribe to abutting surfaces.
2. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure joints in field, where practicable, in the same manner as in factory, with dowels, splines, adhesive or fasteners recommended by manufacturer.
3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

C. Sink installation: Sinks which were not factory installed shall be set in chemical resistant sealing compound and secured and supported per manufacturer's recommendations.

D. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations. Turn screws to seat flat; do not drive.

3.01 ADJUSTING

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

B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.02 CLEANING

- A. Clean shop finished casework, touch up as required.
- B. Clean counter tops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or oils.

3.03 PROTECTION OF FINISHED WORK

- A. Take protective measures to prevent exposure of casework and equipment from exposure to other construction activity.
- B. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

3.04 DELIVERY, STORAGE AND HANDLING

- A. Schedule delivery of casework and equipment 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. 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".

3.05 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.

END OF SECTION