

LABORATORY CASEWORK SPECIFICATIONS

1. **BASE UNITS MUST BE AVAILABLE IN 18", 24", 29", 35", 41", & 47" WIDTHS. ALL CASEWORK MUST BE ABLE TO BE RECONFIGURED IN THE FIELD W/ HAND TOOLS ONLY. ALL BASE UNITS HAVE REMOVABLE BACKS TO ACCESS PLUMBING CHASE. ALL UNITS ARE AVAILABLE IN ADA HEIGHT FOR HANDICAP ACCESS.**
 - A. Sides to be 18-gauge formed with 1" flanges on top, bottom and back with 2-3/16" return on 1" front flange to receive removable pilasters and front of case track.
 - B. Bottom to be 18-gauge formed with 1-3/8" flange and 3/4" return on front with 1" flange down on back and 1" flanges up for welding to sides. Bottom to also have 3/4" access holes, each to receive plastic cap plug, above leveling gusset. Bottom shall be full depth and full width of cabinet.
 - C. Front Crosspiece at top to be 16-gauge, width of opening of cabinet (to create flush surface typical of bottom & side), 1-3/8" high with 3/4" return and 1-1/4" deep with 3/4" return.

All four pieces above, when spot-welded together, will be gas-welded at each front corner and ground smooth to create smooth integral corners for painting.
 - D. Backs to be 18-gauge with no formation at sides, which are spot-welded to side flanges, and 3/4" flange at bottom and top to have 1-1/4" bend with 3/8" return to create rear crosspiece. Backs to have cutouts for access to plumbing connections (one cutout on single width cabinets and two cutouts on double width units to accept removable panels). Sink back to be only 13-3/8" high up from bottom of base, with no cutout, and sink unit shipped with removable rear top rail.
 - E. Rear pilasters to be 18-gauge, spot-welded into each corner. Each pilaster to be 7/16" high x 2-5/16" wide x full height of cabinet opening. Each pilaster to have 1/8" x 5/16" slots on 1/2" centers (typical slottage of front removable pilaster) for adjustable shelves along with provision to accept rear of tracks. Double-wide unit to have center pilaster (between both cutouts) 7/16" high x 3-3/4" wide height of opening with provisions as above on right and left side of pilaster.
 - F. Double units to have center upright 1" wide with two 2-3/16" flanges x height of opening to be welded into place except for open units and units with double-wide drawers. Upright to have typical provisions found on side return. (This piece also to be gas-welded in place at top and bottom, and ground to create seamless joint, typical of corners.)

- G. Integral base located to create 4" high x 3" deep toespace. Base constructed of 18-gauge with two halves, each being full width of base unit with both sides 9-3/4" long. Height of base is 4" with 5/8" returns on top and bottom. Both halves are spot-welded together at each side with 3-5/8"L x 2-13/16"H high splices. (All 4 pieces to be 18-gauge material). Two 14-gauge leveling channels at each side of base with 2 cage nuts in each. Cage nut to receive a 3/8 16 leveler with 1/4" hex head for easy leveling through bottom for approximately 1" of leveling capability.
- H. Adjustable shelves to be of 18-gauge cold rolled steel and formed with 3/4" flanges on all sides with front and back of shelf to have 3/8" return. Shelf size is 19 9/16" front to back. Shelves over 36" in width to have 18-gauge reinforcing channel spot welded to underside of shelf.
- I. Removable rear panels to be 18-gauge in all base cabinets, except sink unit and model 7000 acid storage units. Panel to be full width and height of cutout in back (two required for double units). Panel to be formed of 18-gauge with sides to be 3/8" flanges down, top and bottom to be 1/2" offsets with bottom flange to be 3/8" and top to be 1-1/8" to allow for movement upwards to remove panel. Panel supplied with 3/4" finger hole on center 2" up from bottom and to be equipped with cup plug.
- J. Drawer to be constructed with four pieces: 20-gauge drawer body, drawer back, inside front, and drawer front. All of which are to be spot-welded into one integral piece, with drawer front to be fastened on using sheet metal screws for easy removal when installing locks. Drawer face to be pre-punched knock out to accept lock.
1. Traditional front overall is 7-1/8" high (full) or 3-1/2" high (half). Formed with 7/8" flanges and 1/2" returns with side returns to have provisions to accept inside front and two 7/64" holes to align with mounting angles (which are spot-welded on drawer body) and accept sheet metal screws, also to have prepunched holes on 4" centers to accept wire pull (two pulls required on double-width fronts). Adhesive mounted honey comb sound deadening material to be placed into drawer front.
 2. Traditional inside front in height is 3/4" less than outside front and typical width of inside drawer body. Bottom and both sides to be formed with 27/32" flanges with top to be formed with 1/16" offset, 1/2" high and 17/32" flange. Outside front to be 20-gauge and inside front to be 20-gauge.
 3. Body to be formed out of 20-gauge cold rolled steel with sides form up 2-9/16" on half drawers and up 6" on full drawers with 3/8" flange and 5/16" return at top of both sides. Sides to be formed up with 90 degree bend and will accept inside front and back.
 4. Back to be formed of 20-gauge cold rolled steel with height 2-1/16" on half drawers and 5-11/16" on full height drawers with width being inside dimension of body. Formation to be with 1/2" flanges on all four (4) sides for welding to drawer body with 1/2" return on top of back only.

5. Both inside front and back are spot-welded into drawer body with flanges of inside front and flanges of back welded flush to raw edges of front and rear of body.
- K. Hinged doors to be double pan construction with both inside and outside door formed of 18-gauge cold rolled steel. All four sides formed typical with 13/16" flange and 1/4" return. Two 1/4" diameter holes on center 4" apart and 1-1/2" in from edge of door to receive wire pull: two hinge provisions each typical as follows: 2-9/16" high cutout located from top and/or bottom of door 2-3/16" to center of cutout. Cutout starts 7/32" on front of hinge side and wraps around door to end up 5/32" from same side on rear of door. Typical 3/4" flange on all sides. Hinge brackets (2 per door) are formed of 14-gauge material 5/8" wide x 4-7/8" long with two 1/8" offsets to create 2-9/16" long provision for hinge, which includes 3 holes drilled and tapped for 8/32 machine screws. Outside door and inside door are welded to create one integral rigid piece with sound deadening.
- L. Sliding doors are similar, less provisions for hinges, wire pull and roller catch. In place of these provisions are provisions for door rollers and finger cup.

2. CORNER BASE UNITS

- A. Unit manufactured with front access to be 18" wide, with two front sides at 22-1/2" deep, two rear sides a 17 1/8" deep and back to be 25 5/8" wide.
 1. Front to be full height cupboard door for storage or with partial door and louver panel for sink cabinet.
 2. Two front sides and rear sides to be formed out of one piece on each side with both portions to be solid formation.
 3. Back to be formed typical of base units with one removable back for plumbing and electrical access.
- B. Optional lazy Susan to consist of vertical post with top & bottom mounting provisions for post to be secured into cabinet (independent of countertop) with two full round shelves. Shelves to be adjusting vertically with additional shelves available as option.

3. TABLE APRON & KNEESPACE DRAWERS

- A. Table aprons to be 16-gauge cold rolled steel, 3-3/4" high, 22-1/2" deep (with 28-1/2" depth optional), and width as required or specified by customer. Apron has 1-1/4" top flange and 1" bottom flange and formed in two halves with length being width as specified with two bends 11-1/4" (22-1/2" apron) or 14-1/4" (28 1/2" apron). Unit to be spot-welded together with splices at each side and center support front-to-back when necessary (occasionally, large aprons

manufactured in four pieces in-lieu of halves). Leg pockets to be 14-gauge cold rolled steel, spot-welded into each corner, Legs are bolted in place with 1/4" - 20 bolts.

- B. Standard legs are to be H-leg design, manufactured with 16-gauge 2" x 2" tubing and 16-gauge spreader to weld both legs together with each leg to have 3/8" - 16 levelers, adjustable to 1" in height. H-legs available in both cabinet heights and both apron depths (4 variations).
- C. Kneespace drawers are standard half height drawers in both 18" wide and 24" wide sizes. Drawer housing to be manufactured of 18-gauge cold rolled steel with two sides 3-3/4" high x 22-1/2" deep with 1" flanges on top, bottom & back with front to have 1" flange with 2-3/16" return for drawer roller. Back to be 18-gauge with formation on top to be spot-welded inside of unit between rear of sides. Unit to have top weld strap with 1/2" flange at front, the width of drawer unit. 36" x 48" units to be two single units welded together with front bottom stiffener and rear 16-gauge stiffener, both to be 36" or 48" wide to create integral double drawer unit. Drawer ends available to extend the width of drawer unit. (example: 24" unit with 6" end would create a 30" wide unit). End would be typical of an apron half in formation and gas-welded in place in front and back of drawer unit. Drawer ends also available on both ends of drawer unit. (Example: 7200-30 is a 24" unit with two 3" ends). When using H-legs on a drawer end, the smallest end possible is 4" to accommodate leg pockets.

4. KNEESPACE PANELS, FILLERS & SOFFITS

- A. All panels and fillers to be fabricated out of 20-gauge cold rolled steel. All spring clips used for mounting against cabinets and/or wall are 18-gauge galvanic material.. Mounting flanges on all panels and fillers are 1-1/2" long typical.
- B. Adjustable kneespace panels to accommodate the width of the opening and/or kneespace drawer with mounting flanges and 3/4" x 1/2" box bends at top and bottom. Panels are fabricated of 20-gauge material in four heights: 35 1/2" for 7000 & 7100 series, 31 7/8" with kneespace drawer/apron frame; 28 1/4" for 7300 & 7400 lowboy series, 24 5/8" with kneespace drawer/apron frame.
- C. Front base fillers are fabricated of 20-gauge material in two heights: 35 3/4" for 7000 & 7100 series and 28 1/2" for 7300 & 7400 lowboy series. Each standard with 3" x 4" high toe space at bottom, 3/4" returns at top and bottom, and mounting flanges.
- D. Rear base fillers are fabricated in the same two heights with side-mounting flanges by width of void to be closed. Standard width rear base filler for 30" top to be 6 1/2".
- E. Standard bottom corner toe space fillers are 4" x 4" high.
- F. Miscellaneous fillers available upon request or as needed (size & configuration).

G. Sloping tops to be 20-gauge cold rolled steel with 30 degree slope. Tops for 13" deep will have an overall height of 7 1/2"; tops for 18" deep will have an overall height of 10 3/8". Tops are cut to width of cabinet and include end caps.

5. WALL UNITS MUST BE AVAILABLE IN THE SAME WIDTHS AS THE BASE UNITS & 24", 30, 36", & 48" HEIGHTS. 13" & 16" DEPTHS STANDARD. ALL UNITS TO BE DESIGNED TO BE RECONFIGURED IN THE FIELD TO ADD DOORS OR REMOVE AS NEEDED WITH THE USE OF HAND TOOLS ONLY.

A. Wall units are available in four different heights: 24", 30", 36", and 48". Single widths available in 18", 21", and 24"; double widths available 29", 35", 41" and 47". All units have standard depth at 13" with optional 16" depth available.

B. Tops to be 18-gauge cold rolled steel with overall size to be 13" deep. Tops to have 3/4" flanges on both sides and rear with 1-3/8" flange on front with a 1" return.

C. Sides to be 18-gauge cold rolled steel. Sides will be formed with a 3/4" flange at rear, a 1" flange on bottom and front, with 1" flange and 2-3/16" return to have provisions for hardware.. Sides will have a 3/8" coved bottom and 7/8" spotting flanges. Back will be 3/32" less than the overall width and height of the unit with 7/16" flanges for spot-welding on all four sides. Back will be provided with slottage for adjustable shelf clips on 1/2" centers. Outside bottom will be 1" smaller than the depth of the unit and 1-1/2" smaller than the width. Outside bottom will have 1-5/16" flanges on both sides and 3/4" pointed up in front, which will be gas-welded in place. Typical 18-gauge construction.

1. Shelves, doors, and hardware provisions typical of base units

D. Glass doors to be double-panel, reinforced frame construction as hinged doors. Glass is 1/4" thick, set and held in place in a resilient glazing channel. Sliding doors will operate on nylon rollers suspended from the extruded aluminum track at the top of the door, with a center guide at the bottom. Sliding doors will have recessed aluminum door pulls and glass stop on inside. Rubber channels used to cushion glass in glazed doors shall be a neoprene rubber extrusion.

6. FREESTANDING UNITS MUST BE AVAILABLE IN 18", 21", 24", 29", 35", 41", & 47" WIDTHS AND 18" OR 24" DEPTHS. ALL UNITS MUST BE DESIGNED TO BE FIELD RECONFIGURED TO ADD OR DELETE DOORS WITH USE OF HAND TOOLS ONLY.

A. Freestanding units are 84-1/4" high overall, including flush base. Single widths available in 18" and 24"; double widths available 29", 35", 41" and 47". Depths available are 18" and 24". All specifications typical of wall units except the following:

1. Sides to be 18-gauge, formed only front to back (no formation on top of bottom). Depth is typical of overall unit with 1" front flange and 2-3/16" return.

2. Back to be 18-gauge and has formation only on sides, which are 1/2" flanges for spot-welding.
3. Two side angles of 14-gauge cold rolled steel 11/16" x 11/16" x 7/8" smaller than depth of unit are required; one is spot-welded to the inside bottom of each side
4. 14-gauge angle 1" x 11/32" x 1/4" less than width of unit to be spot-welded onto bottom of back for rigidity.
5. 14 gauge angle 7/8" x 7/8" x 1/4" less than width of units to be spot welded onto top of back for rigidity

7. FINISHES - METAL CABINETS- ALL UNITS MUST BE AVAILABLE IN 16 STANDARD COLORS FOR QUICK SHIP PROGRAM AND BE AVAILABLE TO COLOR MATCH CUSTOMER SELECTION AT NO EXTRA CHARGE. 2 TONING OF CABINET SHELL AND COMPONENTS AVAILABLE AT NO CHARGE.

A. Phosphatizing Process

1. The welded, assembled cabinets shall have all exposed spot- or otherwise- welded surfaces ground to a smooth surface suitable for finishing. The units shall be given a pre-paint treatment to ensure excellent paint adhesion and to aid in the prevention of corrosion.
2. Complete cleaning of the metal shall be accomplished by the use of an alkaline cleaner to remove oil, grease and soil. The units shall be rinsed, followed by the application of a phosphate coating to transform the metal surface into a new, non-metallic and conductive surface. The phosphate treated parts shall be rinsed in cold water.
3. The units shall have all unreacted chemical removed in a chromic acid seal treatment. The completely treated units shall be placed in dry-off oven at high temperature for five (5) minutes to dry the work and stabilize the complete phosphate treatment.

B. Painting Process

1. Following the phosphate treatment, a full powder coating of specially formulated acrylic finish shall be applied and baked on at high temperature for fifteen (15) minutes, then cooled to produce optimum coating properties. (Film thickness of finish coat to be 1.25 to 1.75 mils).

C. Colors

1. 20 Standard colors available plus color matching.

D. Chemical Performance Test

1. Performance Test Method

- a. Chemical performance tests shall be made by applying ten (10) drops (approximately 1/2 cc) of each reagent to the surface to be tested. The reagent is covered by a watch to be tested. The reagent is covered by a watch glass, concave side down, in the center of the puddle to hold the reagent in place. tests for volatile solvents shall be done in such a way that a wet surface shall be maintained for the duration of the test period. A 1" ball of cotton, saturated with solvent, shall be placed on the rest surface. This shall be covered with a small jar to retard evaporation of the solvent. Reagents are allowed to remain on the surface for one (1) hour.
- b. At the end of the test, reagents are removed and the surface is washed down with soap and water and dried before examination and evaluation.

E. Performance Test Ratings

1. Where the terms "excellent" and "good" are used in the performance test results, the following definitions shall apply:

Excellent - The test leaves no visible effect on finish other than a slight change of gloss visible only from a grazing angle.

Good - The test leaves no effect other than slight discoloration, change of gloss or temporary slight softening of film with no loss of film protection.

2. Results of chemical spot performance tests after one (1) hour:

NOTE: Concentration of reagents is percent by weight. All chemicals shall be "reagent grade", in accordance with the requirements of the American Chemical Society.

ACIDS

- Hydrochloric, 37%
- Phosphoric, 75%
- Sulfuric, 25%
- Nitric, 25%
- Glacial Acetic
- Formic, 88%

BASES AND SALTS

- Sodium Hydroxide, 10%
- Sodium Hydroxide, 25%
- Ammonium Hydroxide, 23%
- Hydrogen Peroxide, 5%

SOLVENTS

- Ethyl Alcohol
- Ethyl Acetate
- Ethyl Ether
- Xylene
- Acetone
- Methyl Ethyl Ketone
- Formaldehyde, 37%
- Carbon Tetrachloride

F. Moisture Resistance Test

1. Boiling water shall be trickled over the test panel surface inclined at 45 degree angle for five (5) minutes. At the end of the test, the surface shall be dried and, upon examination, shall show no visible effect on the finish.
2. A cellulose sponge (2 x 3 x 1") shall be soaked with water and place on the test surface for a period of 100 hours. (The sponge must be maintained in a wet condition throughout the test period). At the end of the test, the surface shall be dried and upon examination, shall show no visible effect on the finish.

G. Bending Test

1. An 18-gauge metal strip, finished as required under section 2.155, when bent 180 degrees over a 3/4" diameter mandrel, shall show no peeling of the finish or expose of the base metal.

H. Adhesion Test

1. Performance Requirement
 - a. Ninety (90) or more squares of the test sample shall remain coated after the scratch adhesion test.
2. Test Procedure
 - a. Two (2) sets of eleven (11) parallel lines, 1/16" 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 and examined under 100 foot candles of illumination.
3. Test Evaluation

- a. Ninety (90) of the squares shall show finish.

I. Hardness Test

1. Performance Requirement

- a. The test sample shall have a hardness of 3-H using the pencil hardness test.

2. Test Procedure

- a. 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, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the softest).
- b. 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.

3. Test Evaluation

- a. The paint film shall have a hardness of 3-H minimum.

8. HARDWARE

- A. Base unit drawer and door pulls to be of clean modern brushed aluminum design pull handle w/radiused edges offering a comfortable hand grip and attached to door or drawer with machine screws. Cast pulls shall have adequate cross section to ensure against breakage under rough usage and a chrome finish. Flush pull handles available at no extra charge.
- B. Base unit hinges to be of stainless steel & shall be institutional type with a five-knuckle, bullet-type barrel. Hinges shall be attached to both door and case with three (3) heavy steel screws through each leaf. Welding to doors or case is not acceptable. Doors under 36" in height shall be hung on two (2) 2-1/2" hinges; doors over 36" in height shall be hung on three (3) 2-1/2" hinges.
- C. Base unit door catches to be nylon roller catch type. Use of an active knob and up-and-down bolt assembly will be acceptable only on such special units as solvent storage cabinets or metal floor cases; doors on such units will be locking type.
- D. Base unit and wall case shelf clips for adjustable shelves shall be nickel-plated steel. A channel shall be provided to support the half-depth shelves.

- E. Sink supports shall be of the hanger type, suspended from the top side horizontal 1-1/2" Unistrut rails of the cabinets by four (4) 1/4" rods, threaded at the bottom and offset 1/4" at top to hang from full-length support angles at side rails.

9. TRIM

- A. Leg shoes to be provided on table legs to conceal shims or leveling devices. Shoes shall be covered at bottom, shall be 2-1/2" high and shall be black chemical rubber. Use of a leg shoe that does not conceal leveling device will not be acceptable.
- B. Base molding to be black vinyl, sufficiently pliable to permit cementing tightly against cabinet base and floor line to provide a watertight seal. Molding shall be covered at bottom, shall be 4" high and shall be applied continuously around base of cabinets and cases after installation and leveling to cover any shims and to effect floor seal. Waterproof cement shall be used as an adhesive.

10. MECHANICAL SERVICE FIXTURES

Valve bodies are cast of commercial red brass alloy which conforms to A.S.T.M. standard C85700 or C84400. Flanges, turrets and handles are of forged brass alloy which conforms to A.S.T.M. standard B124-74-280. Assembly components are of red brass alloy or stainless steel alloy. Seals and seat discs are of materials which are suitable for potable water. All fixtures shall be furnished with a chromium-plated finish, highly polished on all exposed surfaces and chrome plated to specifications which conform to A.S.T.M. standard B456-5 and exceed ANSI A112.18.1. Corrosion-resistant finishes may be furnished when specified.

A. Laboratory Water Fixtures

1. All water faucets shall have an operating cartridge that contains all working parts that are subject to wear, and shall close with the pressure of the water to ease shut off and to provide a tight seal. All moving parts which are in the waterway shall be of stainless steel or monel with the exception of seal, which shall be of Ethylene propylene diene monomer. The handle broach shall be a four point tapered broach to allow ease of handle removal. All repair parts shall interchange regardless of fitting type. Faucet shall be capable of converting to manual or self-closing without requiring removal of the body or any special tools. All faucets shall withstand a test of 100 lbs. per square inch.
2. All gooseneck spouts must be attached to faucet body by means of a union connection to allow changing of spouts after installation. Spouts which are threaded directly into faucet body will not be permitted. All gooseneck spouts must be easily converted from rigid to swing or swing or rigid after installation, with no special adapters required. Sealing shall be achieved by double O-ring or E.P.D.M. seal. Vacuum breaker spouts shall be of atmospheric type which conforms to A.S.S.E. standard 1001. Gooseneck spouts shall have a ten-serration hose connector unless otherwise specified.

3. All faucets and needle-type valves shall have fore-arm, forged brass handles with plastic screw-type indicator discs signifying -- by color and letters -- the service controlled and shall have threads integral with discs. The disc shall not be held in place with a separate metal retainer. Fixtures having quick-acting valves shall have lever handles with service indicated by a button in the handle.
4. Steam cocks shall have black molded plastic composition handles and be constructed so they can be easily repacked under pressure and easily converted to needle-type cocks by changing valve steam and seat. Steam cocks shall be indexed accordingly.
5. Distilled water fixtures shall be of red brass alloy with a polished chrome-plated finish over nickel and copper with tin-lined interior, or PVC type as specified. All distilled water fixtures shall be self-closing type.
6. Vacuum Breakers shall be chrome-plated brass and shall be either "Water-Saver" or "Chicago" types, as required by the area plumbing code. Vacuum breakers shall be installed between the control valve and the outlet of the fixture. When the area plumbing code requires vacuum breakers to be installed in an elevated position, the piping necessary to connect valve, vacuum breaker and hose end shall be supplied by the plumbing contractor.

B. Gas, Air, and Vacuum Cocks

1. All ground key service cocks shall have stem and body ground and lapped and shall have stem held in place by spring and locknut that has been staked to prevent removal. Each fixture shall be leak proof at 40 lbs. maximum pressure per square inch (PSI) when tested under water.
2. All floating needle point valves shall have working parts contained within a removable cartridge. Needle point shall be stainless steel precision finished and shall be held in place on stem assembly with a U-clip which is of stainless steel. Needle point shall seat against a brass seat contained within a replaceable sleeve. Micro control type valves shall have same features as needle point and shall have a tapered needle point and shall have a length no less than .750 inches and shall seat into an orifice no less than 1/8" diameter. Valve shall have a minimum of 5-1/2 full turns of the handle from off position to full on position. Each fixture shall be leak proof at 125 lbs. maximum PSI when tested under water.

C. Remote Control Valves

1. Remote control valves shall consist of 3/8" compression disc valves for water and steam fixtures and 3/8" slow compression true needle valve for gas, air and vacuum fixtures, complete with extension rods having handles with colored button indexes for each service as specified for each fixture.

2. Extension rods shall operate valves through an escutcheon-plate bearing mounted on the exterior of the scientific laboratory furniture equipment. Portions of remote control fixtures exposed within fume hood chamber shall be furnished with a chemical-resistant finish.

D. Mounting Shanks

1. Mounting shanks shall be furnished with required to anchor fittings to service shelves, ledges and decks for all fixtures except electrical. They shall provide a running pipe thread running into a tapered thread to provide leak-proof joints and a locknut to provide a means of anchoring fixture to the ledge.

E. Serrated Hose Ends

1. Serrated hose ends shall be provided on all water and steam fixtures. Serrations shall be so designed to hold hoses securely. An aerator, when so specified, shall be furnished in place of the serrated hose ends for water fixtures.

F. Color Index Buttons

1. Handles of fixtures shall have screw-on type, color-coded index disc to designate type of service on all mechanical service fixtures. Both color and lettering shall be provided in button (screw-on type) which shall be located in handles of fixtures. Buttons shall not be held in place with a metal retainer. All indexes shall be of colored plastic material, and indented letters shall be filled with enamel in contrasting colors. Color designations shall be as follows:

<u>SERVICE</u>	<u>INDEXING</u>	<u>BUTTON COLORS</u>	<u>LETTER COLORS</u>
Cold Water	CW	Dark Green	White
Hot Water	HW	Red	White
Gas	GAS	Dark Blue	White
Air	AIR	Orange	Black
Vacuum	VAC	Yellow	Black
Distilled Water	DW	White	Black
Steam	STM	Black	White
Oxygen	OXY	Light Green	White
Nitrogen	N	Gray	Black
Hydrogen	H	Pink	Black

11. ELECTRICAL FIXTURES

- A. Deck mounted electrical fixtures shall be 20-Amp, 110-volt, 3-wire polarized grounded receptacles. Reagent rack mounted and flush mounted receptacles shall be 15-Amp, 125-volt.

- B. The electrical pedestal-type fixtures and electrical flush boxes are to be corrosion-resistant aluminum alloy, polished to a chrome-like finish.
- C. All receptacles shall be designated to permit only plugs having the same current characteristics as the service line to be inserted.
- D. All fixtures and any electrical conduit or fittings to be furnished under these specifications shall be accordance with requirements of the National Electrical Code and the National Fire Prevention Association.

11A. STEEL CASEWORK CONSTRUCTION PERFORMANCE

- A. Base cabinets shall be constructed to support at least a uniformly distributed load 200 lbs. Per square foot of cabinet top area, including working surface without objectionable distortion of interference with door and drawer operation.
- B. Base cabinet corner gussets with leveling bolts shall support 500 lbs. Per corner, at 1-1/2" projection of the leveling bolt below the gusset.
- C. Each adjustable and fixed shelf 4 ft. or shorter in length shall support an evenly distributed load of 40 lbs. per square foot up to a maximum of 200 lbs., with nominal temporary deflection, but. without permanent set.
- D. Drawer construction and performance shall allow 15" clear when in an extended position and suspension system shall prevent friction contact with any other drawer or door during opening or closing. All drawers shall operate smoothly, a minimum of 10,000 cycles with an evenly distributed load of 150 lbs.
- E. Swinging doors on floor mounted casework shall support 200 lbs. suspended at a point 12" from hinged side, with door swung through an arc of 160 degrees. Weight load test shall allow only a temporary deflection, without permanent distortion or twist. Door shall operate freely after test and assume a flat plane in a closed position.

12. COUNTERTOPS

- A. Epoxy resin countertop tops shall be cast of modified thermosetting epoxy resin, 3/4", 1" or 1-1/4" thick. Tops shall be a uniform mixture throughout and not depend on a surface coating which is easily removed by physical or chemical abuse. Marine edge to be provided when specified. Backsplash and end splash to be loose 4" high x 1" thick and coved to top during installation. Epoxy tops will be furnished in standard Black Onyx with the option of Platinum Gray at additional charge.

Epoxy resin tops are blended to provide maximum chemical resistance and physical strength. Finished material shall conform to the following physical properties testing:

Compressive strength	(ASTM D-695)	34,200 lbs./sq. in.
Tensile Strength (avg)	(ASTM D-638)	10,100 PSI
Flexural Strength	(ASTM D-790)	16,200 lbs./sq. in.
Rockwell "M" Hardness	(ASTM D-785)	111
Density	(ASTM D-792)	2.03g./cc
Water Absorption	(ASTM D-570)	0.004%
Fire Resistance	(ASTM D-635)	ATB (sec)=0 Samples did not ignite

- B. Stainless-steel countertops shall be Type 304 No. 4 satin finish. Tops shall be of 18-gauge stainless steel reinforced on the underside by 16-gauge carbon steel channels, so spaced as to prevent twisting, oil-canning or buckling. Exposed edges of top shall be formed into a channel shape 1-1/4" high. Tops may be fabricated with a marine edge when specified. Backsplashes and curbs shall be integral and formed from the same sheet as the top. Sink tops shall be pitched to sink bowl for proper drainage. All sink basins shall have bottoms sloped towards drain openings. Entire underside of tops shall be sprayed with sound-deadening material.
- C. Laminated plastic tops shall be 1/32" thick laboratory grade high pressure laminate which shall not crack or splinter and shall be heat resistant. The laminated plastic shall be attached with a water-resistant adhesive to a moisture-resistant particle board core or optional treated plywood, providing a finished overall top thickness of 1-1/4". Tops shall have a self-edged front edge. Tops with curbs shall have attached 4" high x 3/4" thick curb with a 90-degree angle at the junction between top and curb. Underside of top is to be sealed with a protective coating. Post formed plastic laminate countertops are also available.
- D. Characteristics (Countertops)

1. Tolerances:

- a. Size: Length, plus 0, minus 1/6"; width and thickness, plus or minus 1/32".
- b. Squareness: Plus or minus 1/64" for each 12". (A tabletop spanning 48" will be held to plus or minus 1/16").
- c. Fabrication: Location of cutouts and drillings -- plus or minus 1/16" sizes of cutouts and drillings - plus 1/16" minus 0.
- d. Flatness (Warpage): Plus or minus 1/16" for each 48" span.

13. SERVICE SHELVES, LEDGES AND DECKS

- A. The ledges and shelves shall be easily altered on the job site to accommodate existing wall conditions and shall be easily drilled to accommodate service lines. Service ledges and shelves

shall provide a raceway behind the base units to house the mechanical service piping. Ledges are available in any of the materials listed above.

- B. Service shelves shall be supported by angular brackets, capable of being mounted on strut supports or directly off wall providing for fine shelf adjustment.
- C. Service ledges shall be supported by a 90 degree wall angle at the rear, and the countertop backsplash at the front.
- D. Service shelf and service ledge fillers, where shown or called for to enclose open spaces at the end of wall and island assemblies, shall be finished in the same material as the service shelving. They shall be provided complete with means for attaching to the service shelving and shall cover the piping from the top of the service shelf to the base cabinets.

14. SINKS, DRAIN TROUGHS AND CUP SINKS

- A. Epoxy resin sinks shall be completely cured during processing. Sinks shall be one piece, non-glaring, black in color (gray or beige optional) with generous covering in all corners and bottom, and a minimum of 1 degree dishing to outlet. Sinks shall possess high resistance to mechanical and thermal shock. Sinks shall be field-bonded to the underside of the countertop or top mounted into rabbeted cutout to become an integral part of the epoxy resin top.
- B. Stainless steel sinks shall utilize Type 304 stainless steel and all exposed surfaces shall be finished in a No. 4 satin finish. Sinks shall be of 18-gauge metal unless heavier gauges are specified or dictated by construction requirements. All sink joints shall be butt-welded by the heliarc-welding process. Inside radii shall be 1-1/8". bottom shall be pitched to the sink outlet. Where stainless steel countertops occur, sinks shall be welded to form an integral part of the top. No soldering will be permitted in connection with the construction of sink bowls.
- C. Drain troughs shall be constructed of epoxy resin. The troughs shall be cast units with no longitudinal joints, with a generous radius provided in the bottom corners for easy cleaning. A slope of 1/8" or more per foot shall assure complete drainage.
- D. Cup sinks shall be epoxy resin, stainless steel, or Kimax* brand glass as specified.

15. SINK ACCESSORIES

- A. Traps and drain fittings shall be polypropylene or Kimax* brand tempered glass. They shall be included as part of the sink assembly only when material is specifically called for and shall be 1 1/2" or 2" in diameter as indicated.
- B. Traps shall be a standard "P" type and shall have a beaded end for connection to the main drain line by use of a coupling or be provided with standard IPS thread.

- C. Kimax* brand or polypropylene traps shall be furnished for all sink assemblies when specified.
- D. Sink strainer and tailpieces shall be furnished as a standard part of each sink assembly. Sink strainer shall be crisscross-type with 1 1/2" diameter outlet.
- E. Standing beehive or open-end type overflows shall be provided when specified.

16. CANOPY HOODS

- A. The canopy hood efficiently collects exhaust heat, steam and odors when mounted over work areas where steam baths, hot plates, and other heat-producing equipment is employed.
- B. The superstructure is finished with a chemical resistant painted sheet steel. The standard canopy hood is 30" deep and 18" high with duct collar of 8", 10", 12", 16" or 20" diameter. Threaded hanging rods can be provided with couplers for additional ceiling height when specified. Stainless steel construction, duct transitions and baffles are optional and provided only when specified.

17. FUME HOODS

- A. General: Hood superstructure shall provide for efficient removal of all fumes, both heavy and light, with the least amount of turbulence of air entering the hood.
- B. Materials: The exterior of the superstructure shall be fabricated of cold rolled furniture steel finished in color selected. Lead coated steel is not acceptable. Exterior finish shall be chemical resistant 2-part epoxy finish. The interior shall be non-asbestos, primaline, stainless steel, Wesliner 1125 or approved equal.
- C. Body Construction: Fume hood superstructure shall be double wall construction consisting of an outer shell of sheet steel and an inner liner of corrosion resistant material as specified. The double wall shall house and conceal steel framing members, attaching brackets and the remote operating service fixture mechanisms. The frame, outer shell, and inner lining shall be assembled, fastened and connected into a rigid, self supporting entity.
- D. Wall thickness shall be 5-7/8" maximum, providing maximum interior work area. The interior end panels shall be furnished with a removable panel to provide access to the service piping and valves to facilitate installation and maintenance.
- E. Framework: The inner lining and exterior finished panels are attached to a framework constructed of 16-and 18-gauge steel. This framework is welded and bolted together to form a rigid assembly and is painted with a black rust-inhibitive finish. All steel parts are treated with an iron phosphate bath to resist corrosion and ensure adhesion to finish materials. The inner lining material is securely fastened to this frame assembly by use of stainless steel screws. The

outer panels are removable to facilitate installation of plumbing fixtures, piping, electrical fixtures and wiring.

- F. Sash: Fume hood sash shall be full view type providing a clear and unobstructed side-to-side view of fume hood interior and service fixture connections. Vertical sliding sash constructed of 18-gauge steel, welded into a rigid frame, and has removable stainless steel glass retainers for reglazing...sash has full length finger lift and is supplied with nylon glides on each side. Sash guides are stainless steel. The sash is glazed with 7/32" clear laminated safety glass set in a "U" shaped neoprene channel. The sash is counter-balanced using a singled weight at the rear of the hood, and is attached to the sash with 1/16"...7 x 7 plastic coated aircraft type cable...total diameters of .105". Cables ride on six 2" diameter nylon ball bearing pulleys. Sash weight shall be located in the center back of the hood and made of 1/2" thick metal plate. Other materials for the weight, such as stone, shall not be acceptable. Weight shall be supplied with plastic guides for ease of operation, and shall run in roll formed steel channels. Channels shall be coated with rust-resistant finish. Weights shall be drilled and tapped and be supplied with threaded eye bolts for attachment to sash cable. Sash weights in side walls of hoods are not acceptable. Six and eight foot wide fume hoods shall have two laminated safety glass panels separated by a reinforcing mullion.
- G. Lights: A two-tube, rapid start, vapor sealed fluorescent light will be provided on each superstructure. These maximum length fixtures are relamped from the outside. Average interior illumination levels of the work area shall be 80 foot candles minimum. Work area shall be defined as that area inside the superstructure from side to side and from face of baffle to the inside face of sash and from the working surface to a height of 28 inches. Bulbs are included.
- H. Baffles: Baffles shall provide controlled air vectors into and through the fume hood, and be fabricated of the same material as the liner. Exhaust slots shall be provided with upper and lower slots adjustable. A fixed, permanently open horizontal slot located 17" above the work surface shall be provided. Fume hood shall maintain essentially constant exhaust volume at any baffle position. Changes in average face velocity and exhaust volume as a result of baffle adjustment shall not exceed 5% for any baffle position at the specified face velocity.
- I. Air Foil: Perimeter of access opening shall have an air foil or streamlined shape with all right angle corners radiused or angled. Bottom horizontal foil shall provide a nominal one inch bypass when the sash is in the closed position. Bottom foil shall be removable without the use of special tools. Bottom foil shall be stainless steel to provide proper acid and abrasion resistance. Exhaust outlet shall be rectangular.
- J. Worktop: Fume hood worktop shall be 1-1/4" epoxy resin dished 1/4" to contain spills. Service slots are provided. Stainless steel worktops will be provided only when specified.
- K. Base: Fume hood base shall be standard 2-door type unless acid/solvent or flammable storage is specified. Construction to be typical of standard Lab Design base units.

- L. Services: Services shall be provided when specified. Fixtures shall be chrome plated unless epoxy or other coating material is specified.
- M. Alarm: The AMS 335 alarm alerts the user to abnormal conditions using both visual and audible alarms. Visual 3 color quick indicator display for safety, shows airflow in feet per minute in seconds. LED's are calibrated per installation for high, normal or low flow conditions. A test button allows the operator to check audible alarm. The audible alarm also has a *push to silence* button.

18. Radioisotope Fume Hoods

- A. Front opening is framed with a 45 degree angle fascia that substantially reduces the turbulence of air entering the hood. The bottom horizontal airfoil directs a current of air at countertop level to purge heavy fumes or spillage.
- B. Laboratory hoods designed to handle radioactive materials shall have interior lining constructed entirely of 16 gauge type 304 stainless steel with No. 4 finish. Seams and joints present in the superstructure and work surface shall be welded, sealed or soldered to eliminate pockets, cracks and crevices that would permit a build-up of radioactive materials. The superstructure shall be sealed to the work surface by one of the methods listed above. The laboratory hood interior shall resist the action of cleaning compounds and cleaning agents used in decontamination procedures.
- C. The integrated stainless steel work surface shall be watertight and dished and furnished with a raised edge to contain spills and cleaning liquids, and shall be properly reinforced to support lead shielding and shielded containers. Worktop includes a 3"X6" stainless steel oval cupsink. Load bearing capacity shall be 200 lbs. per square foot minimum up to a total weight of 1,000 lbs. per hood or base cabinet of base cabinet section.
- D. The entire stainless steel hood interior shall be reinforced with angles to provide a completely rigid assembly and shall be welded together to form a self supporting hood assembly to which the exterior cold rolled steel parts can be mounted. A stainless steel duct collar shall be provided in the top of the hood plenum chamber in back of the top sloping baffle. The hood fascia panels and the hood interior shall be punched to receive the service fixtures specified.

19. Perchloric Acid Fume Hoods

Laboratory fume hoods shall be identified by a label indicating suitability for use with perchloric acid procedures.

- A. Font opening is framed with a 45 degree angle fascia that substantially reduces the turbulence of air entering the hood. The bottom horizontal air foil directs a current of air at countertop level to purge heavy fumes or spillage.

- B. Interior lining is solid welded type 316 stainless steel with No. 4 finish. The integrated worktop is dished 1/4" with a full width drain trough at the back. The trough slopes from 3" deep on the high side to 4" deep on the low side, with a 1-1/2" drain outlet. The washdown system consists of a perforated pipe behind the upper baffle with remote control in the front post.
- C. The baffles shall be removable to allow periodic inspection.

20. FABRICATION

- A. All metal furniture required under the drawings and specifications shall be furnished in strict accordance with the description and details hereinafter provided. Construction and design shall develop maximum strength and rigidity in each sectional unit.
- B. Each sectional unit shall be fabricated as an integral unit in itself to permit relocation at any subsequent time.
- C. The door- and drawer-heads must be removable for purpose of decontamination and/or cleaning.
- D. Doors and drawers shall be sound deadened and readily removable, with door hinges easily replaceable.
- E. All hinges shall be applied to case and door bodies as hereinafter specified. Welding of hinges to either door or case will not be permissible.
- F. Where unit are joined together in assemblies, they shall be fastened by bolting through side panels with 1/4-20 bolts.
- G. All components parts shall be die-formed, ensuring uniformity and interchange-ability, and shall be assembled in jigs of accurate alignment.
- H. All cabinet parts shall not only be electrically welded, but shall be notched, keyed and overlapped, forming interlocking joint construction. The electro-welding shall be comprised of spot-welding, arc-welding and heliarc welding.
- I. Any notching, piercing, bending or framing not specifically called for in the construction specifications and/or drawings will not be permitted.
- J. All construction shall ensure a smooth, cleanable interior of all units.
- K. All die-pierced slots and perforations required for mounting of case channels, hinges, or shelf brackets shall not be visible from the exterior of the assembled cabinet after installation. Screws shall not be used in the construction of the unit proper and shall only be used where backs, pans and panels are required to be removed for accessibility.

- L. Standard cabinet units shall be so constructed that they will permit quick and easy change, after installation, from drawers to doors, or vice versa, or the substitution for two (2) half-depth drawers in place of a standard-depth drawer with the purchase of the necessary parts.
- M. All sectional units to be located on the laboratory floor shall be equipped with leveling devices easily adjustable from within the units, to compensate for unevenness in the laboratory floor.

21. DESCRIPTION OF WORK

- A. Lab Design shall furnish and install all metal scientific laboratory furniture, including conventional base and wall cabinets with end panels; service shelves, ledges and decks; tops made of epoxy resin, stainless steel, natural stone, composition cement and laboratory-grade plastic laminate; sink basins, cup sinks and drain troughs, excluding final connection; overflows, strainers, tailpieces and traps; service fixtures excluding final installation and connection fume hoods, excluding work beyond exhaust collar on hood; and all miscellaneous items of equipment as listed in these specifications and on equipment lists and/or shown or scheduled on drawings.
- B. Lab Design shall provide all necessary cutouts and openings for plumbing and electrical services as well as all filler panels and scribe strips as required where equipment abuts wall and corner conditions in order to obtain a completely enclosed assembly.
- C. Fume hood assemblies shall include blowers, when system-designed to be integral with fume hood; however, installation of blowers and work beyond exhaust collar on hood shall be done by mechanical contractor. Wiring for blowers and switches shall be done by electrical contractor.

22. WORK NOT INCLUDED

- A. Contractors for plumbing, heating, ventilation and electrical work will bring all services to, and install such services in, on, through or adjacent to, the laboratory furniture and equipment as required to complete the installation. Such work shall include any special items required to meet local codes, even though not specifically called for in specifications or shown on drawings.
- B. The plumbing contractor, under Division 15, shall furnish, install and final connect all piping, fixtures and fittings, including faucets, traps, valves, vacuum breakers, sink outlets, overflows, drain lines, steam lines, air lines, gas lines, water lines, etc. He shall make final installation and connection of all fixtures and fittings provided by scientific laboratory furniture contractor. He shall also provide, install and connect all other fixtures not a part of the laboratory furniture contract.
- C. The electrical contractor, under Division 16, shall furnish, install and final connect all electrical service, conduit, wiring, fixtures, outlets, service strips and special electrical equipment and accessories for a complete operational installation.

End of Section