SECTION 12 35 53

Metal Laboratory Casework

1. BASE UNITS

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 1/2" return on front with 1" flange down on back and 3/4" 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 18-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 3/8" 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 cabinet bottom, with no cutout.

E. Rear pilasters to be 18-gauge, spot-welded into each corner. Each pilaster to be 7/16" high x 2-9/32" 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 3-21/32" 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 toe space. 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 18-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 20-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 20-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 pre-punched holes on 4" centers to accept wire pull (two pulls required on double-width fronts). 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 22-gauge.

3. Body to be formed out of 22-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 22-gauge cold rolled steel with height 2-1/16" on half drawers and 511/16" 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 20 gauge cold rolled steel. Sides formed typical with .85" flange and 1/4" return. Two 1/4" diameter holes on center 4" apart set back from door edge to receive Aluminum Handle. Two hinge provisions for each. Typical 11/16" flange on all sides. Hinge brackets (2 per door) are formed of 14-gauge material which includes 3 holes to firmly secure door to cabinet shell. Outside door and inside door are assembled to create one integral rigid door 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 18-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 111/4" (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 16-gauge cold rolled steel,

spotwelded 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 is manufactured of 18-gauge cold rolled steel with two sides 3-3/4" high x 22-1/2" deep. Drawer Back is 20-gauge steel formed to be spot-welded inside of unit between rear of sides. Unit to have top weld strap with ½" 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 two 3" ends 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 are available on a single end or both ends of drawer unit. When using H-legs on a drawer end, the smallest end possible is 4" to accommodate leg pockets.

4. KNEESPACE PANELS, FILLERS, SOFFITS, & VERTICAL SERVICE CHASE

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 ½" box bends at top and bottom. Panels are fabricated of 22 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 three heights: 35 3/4" for 7000 & 7100 series 28 1/2" for 7300 & 7400 lowboy series and 32 1/8" for ADA versions. 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.

H. Vertical Service Chase to be 18-gauge cold rolled steel formed in an enclosed structure. Interior flanges at top and bottom for internal mounting to surfaces. Individual sections of service chase produced to a maximum of 8' high, multiple sections internally joined at flanges to reach required height. Removable access panels on one side which will be mounted flush to the body of the service chase with flathead sheet metal screws, removable without the use of special tools. Stiffener channels applied within the service chase to provide reinforcement and stability to the structure. The service drop shall be painted on all surfaces to match cabinets. Optional fixture cutouts able to be provided as needed.

5. WALL UNITS

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 15/16" 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 are constructed the same as Solid steel doors & reinforced frame construction as hinged doors. Glass is 1/4" thick, set and held in place in a resilient glazing channel. Glass panel starts 3" in from each side & end. When calculating glass area, subtract 6" from door width or door height to determine the glass portion of the door. 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 door pulls and glass stop on inside.

6. FREESTANDING UNITS

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 spotwelding.

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" ¼" less than width of units to be spot welded onto top of back for rigidity

7. MOBILE BASE CABINETS

A. General: Mobile base cabinets shall be constructed from the same material, gauge, finish, style, etc… as described in this section. Refer to drawings for mobile base cabinet sizes.

B. Cabinets shall be furnished with finished sides and back.

C. Provide two fixed casters at the rear and two swivel at the front, locking casters in the front of the cabinet.

D. Furnish cabinet with interlocking drawers that allows only one drawer to be opened at a time. Provide counterbalanced weights in the drawer cabinets that prevents the cabinet from tipping over when a drawer is opened.

E. Provide 1-inch thick epoxy resin countertop on mobile base cabinet. Countertop shall be securely fastened to base cabinet that does not allow the top to be movable.

8. FINISHES

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.

9A. 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.

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.

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