

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1 and requirements specified herein.

1.2 RELATED SECTIONS

- .1 Section 09 65 16 - Resilient Sheet Flooring
- .2 Division 22 - Plumbing
- .3 Division 26 - Electrical Outlets and Wiring

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009, Particleboard.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A167-99 (2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M-11a, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - .3 ASTM A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM B117-07, Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - .5 ASTM B28, Methods of Chemical Analysis of Special Brasses and Bronzes.
 - .6 ASTM B456-11, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .7 ASTM E478-08, Standard Test Methods for Chemical Analysis of Copper Alloys.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA O112 Series, CSA Standards for Wood Adhesives.
- .4 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)

1.4 DESCRIPTION

- .1 System:
 - .1 Supply and install all casework, Epoxy countertops (including integral epoxy sinks and drainage boards), ledges, supporting structures, mobile tables, balance table, and

drying racks as per drawings and specifications. Include delivery to the project site.

- .2 All casework shall be manufactured as individual cabinets. Each module shall be self-supporting with interior and exterior gables finished to allow removal and relocation of the cabinet without alteration to the cabinet.
- .3 Coordinate locations of all bench top utility service turrets, utility service outlet accessory fittings, electrical receptacles and switches identified on drawings as mounted on the laboratory furniture. All plumbing and electrical fittings supplied under this sections, not preinstalled in equipment, will be packaged separately and properly marked for delivery to the appropriate contractor.
- .4 Supply and installation of countertop installation materials such as adhesives, abrasives, hardware, installation instructions and maintenance information. Provide countertop preparation for plumbing, electrical and equipment requirements from approved shop drawings.
- .5 Furnish and deliver, for installation by the mechanical contractor, all Laboratory fittings, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.
- .6 Supply and set in place all grommets mounted on or in laboratory benching.

- .2 Service fittings, mechanical and electrical bench top services turrets mounted on or in laboratory benching by Mechanical and Electrical contractors.
- .3 In addition to requirements specified above, provide other work and perform other services, whether or not specifically required by contract documents, necessary for completion of work of this Section.

1.5 RELATED WORK

- .1 Mechanical service lines from rough-in points to

fixtures on the casework: Mechanical Drawings.

- .2 Electrical conduit and wiring from rough-in points to fixtures on the casework: Electrical Drawings.
- .3 Wall/Toe kick base: Coordinate work with flooring contractor. Provide continuous backer in kick space for coved base attachment as per Division 9, Finishes.
- .4 Supply and connection of Plumbing Services to service fixtures, sinks, and bench top service turrets: Mechanical Drawings.
- .5 Supply and connection of Electrical and Data Services to service turrets (pedestals) and flush mounted electrical outlets in bench tops: Electrical Drawings.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate:
 - .1 Details of laboratory casework construction and related and dimensional position, with sections, including service run spaces.
 - .2 Location of each casework unit.
 - .3 Location of all integral sinks and drainage boards.
 - .4 Location of all plumbing items, including sinks, faucets, strainers and bench top service turrets (cocks).
 - .5 Location of all electrical items, including power and data services and bench top service turrets.
 - .6 Confirm that support for countertop across knee spaces etc for countertop meets countertop manufacturer's recommendations for 32mm countertop edge thickness.
- .3 Locations of all typical and special installation conditions, and all connections, attachments, anchorage and location of exposed fastenings.
- .4 Include test reports by independent testing

laboratories indicating results of furniture finish tests.

1.7 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples of:
 - .1 Each countertop material, 300 mm x 300 mm including external corner.
 - .2 Each standard colour of cabinet finish on 300 mm x 300 mm steel sheet.
 - .3 Each item of cabinet hardware.
 - .4 Each item of plumbing brass and electrical outlet.
- .3 Submit one base cabinet complete with cupboard and drawers, minimum 600 mm wide, including specified bench top, splashback, end return and curb shelf. Sample to be submitted within 14 days of contract award.
- .4 Submit wall case minimum 300 mm wide x 600 mm long complete with door panel and 1 shelf.

1.8 PRODUCT DELIVERY, HANDLING AND STORAGE

- .1 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 15 degrees Celsius and relative humidity 25% to 55%.
- .2 Cover counter tops at shop with heavy kraft paper.
- .3 Schedule delivery to site with Project Manager. Do not deliver components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather.
- .4 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties.

1.9 PROTECTION OF INSTALLED WORK

- .1 Provide foam or kraft paper cover for countertops and casework to protect them from damage from ongoing construction finish work from time of installation to substantial completion.

- 1.10 WARRANTY
- .1 Provide warranty of at minimum one year to make good or replace any goods under normal use. Provide the Departmental Representative with a written warranty to this effect.
- 1.11 CLOSEOUT SUBMITTALS
- .1 Maintenance Data - Provide maintenance, cleaning, and life cycle information. Include recommended cleaning materials and procedures, and list of materials detrimental to casework and epoxy resin.
- 2 PRODUCTS
- 2.1 MATERIALS
- .1 Stainless steel sheet: to ASTM A167 ASTM A240/A240M, Type 304, with powder coat finish to meet SEFA-8 chemical requirements.
- .2 stainless steel tubing: AISI Type 304, commercial grade, seamless welded, 1.5 mm wall thickness.
- .3 Glazing: All glass in cabinets shall be 5 mm transparent tempered safety glass.
- .4 Sealants: As recommended by the cabinet manufacturer.
- .5 Colours:
- .1 Allow 1 colour for case bodies.
- .2 Allow 1 colour for door and drawer fronts.
- .3 Allow 1 colour for countertops.
- .4 Colours to be selected by Departmental Representative from manufacturer's standard palette.
- 2.2 COUNTERTOP MATERIALS
- .1 All countertops to be Solid Epoxy Resin: Sheets cast from modified epoxy resin and non-asbestos inert fillers; compounded mixture cured and thermoset specifically from formulation to provide exceptional physical and chemical resistance required in medium to heavy duty laboratory environments.
- .2 Poured epoxy: apply 100% solid epoxy resin compound at rate which will produce finished thickness of not less than 25.4mm thick, with a uniform, non-reflecting surface which is free of minute pin holes, air bubbles and pores. Use 0.25 mm thick coating for concealed and unfinished surfaces.
- .1 Epoxy finished surfaces to conform to following minimum requirements:
- .1 Tensile strength: 20 to 30 MPa.
- .2 Flexural strength: 700 MPa.

- .3 Compressive strength: 100 MPa.
 - .4 Impact strength: 4 J.
 - .5 Hardness: 100 Rockwell.
 - .6 Linear shrinkage on curing: 0.4%.
 - .7 Water absorption: 0.1%
 - .8 Good flexibility, hard abrasion, impact and thermal shock resistant.
 - .9 Resist immersion in water, and heat up to 100 degrees.
 - .10 Resistance against alkaline substances, detergents and coolants.
 - .11 Resistance to acid fumes, acid solutions, greases and oils.
 - .12 Resistance to wide range of corrosive chemicals and solvents.
 - .13 Will not support mould or fungus growth.
-
- .3 All countertops to have 32mm contoura control top edge on all exposed edges.
 - .4 Colour from standard palette excluding white. Colour by Architect.
 - .5 Fabricate laboratory countertops and backsplash.
 - .6 Fabricate countertop and backsplash sections in as long a length as practicable to minimize joints.
 - .7 Factory cut holes for fittings, accessories, and equipment.
 - .8 Round exposed edges and corners of countertops and backspash to 4 mm.
 - .9 Finish exposed edges and surfaces in same manner as specified for working surface of countertop material.
 - .10 Make allowances around periphery and where fixed objects pass through or project into countertop material to permit normal movement without restriction.
 - .11 Joints: field welded or mechanical watertight.
 - .12 Installation materials: provide to site as required for recommended installation including joint adhesive, panel adhesive, sealants, abrasive sheets and pads, hardware, recommended installation instructions and maintenance information, all as recommended by the countertop manufacturer.

2.3 SINKS

- .1 Double Bowl Molded Epoxy Resin flush Sinks complete with Integral Epoxy Resin drainage board:
 - .1 Mold sinks from thermosetting epoxy resin.
 - .2 Mold interior corners to radius. Slope sink base to drain outlet.
 - .3 Provide 38mm outlet with open ended standpipe; standpipe overflow 50mm shorter than depth of sink.
 - .4 Unless otherwise indicated, fabricate sinks of drop-in design supported by upper flange from worksurface.
 - .5 Color: To match adjacent worksurface.
 - .6 Dimensions:
 - .1 Overall dimension:
 - .1 Width: 1676mm
 - .2 To fit within Depth of Metal cabinet.
 - .2 Interior Sink Dimension: Inside 950mm x 381mm x 275mm Dp.

2.4 LABORATORY
SERVICE FITTINGS

- .1 Coordinate with Mechanical Drawings and Specifications.
- .2 Provide fittings with wall flanges, shanks, lock nuts, couplings, nuts and tailpieces.

2.5 ELECTRICAL FITTINGS

- .1 Coordinate with Electrical Drawings and Specifications.

2.6 PEGBOARD DRYING RACK

- .1 Fabricate from 304 stainless steel with a No. 4 satin finish complete with integral drip trough and catch drain as indicated on drawings.
- .2 Polypropylene pegs shall be removable without tools
- .3 Provide wall hangar to allow removal of pegboard without tools.
- .4 Pegboard shall be complete with funnel rack, drain basket and screen insert and utility shelf.
- .5 Size: Nominal 610 mm W x915 mm H.
- .6 Quantity: 2

2.7 MOBILE TABLE

- .1 Stainless Steel.
- .2 Dimensions: Nominal 889mm H x 1524mm W x 558.8mm Dp.
- .3 Provide 2 drawers
- .4 Standard of Acceptance: Canadian Scientific Utility Table UT356022-002, or equivalent.

2.8 BALANCE TABLE

- .1 Antivibration Marble Balance Table:
 - .1 Overall Dimensions: 88.9cmL x 61cmW x 78.7cmH
 - .2 Table top and legs are to be 7.6 cm thick, solid marble
 - .3 Legs to be reinforced with cast-iron support pipe coated for corrosion resistance.
 - .4 Include 4 vibration dampers.

2.9 FABRICATION

- .1 Fabricate steel laboratory casework to manufacturer's standard details.
- .2 Align end panels, top rails, bottoms and vertical posts, at intersections in same plane, without overlap.
- .3 Grind exposed welds flush and smooth, burnish to match adjacent surfaces.
- .4 Provide 2 mm thick metal for tapping strips, gussets, drawer runners and hinge reinforcements.
- .5 Use minimum 1.5 mm thick metal for cabinet top rails, hanging brackets, frame and base.
- .6 Use minimum 1.2 mm thick metal for cabinet door outer pan and slide support, cross rails, cabinet fronts, scribe strips and fillers.
- .7 Use minimum 0.9 mm thick metal for drawer and door inner panels, drawer bodies and back panels to cabinets.
- .8 Epoxy Resin Worksurfaces: Fabricated tops and accessories in accordance with manufacturer's recommendations, approved Shop Drawings, and SEFA 8.
 - .1 Thickness:
 - .1 32mm contoura control top edge on all exposed edges.

March 2016

- .2 Check each sheet at factory for required thickness.
- .3 Maximum variation in thickness: plus or minus 1.6 mm from corner to corner.
- .2 Warpage:
 - .1 Inspect tops for warpage prior to fabrication by placing on true flat surface.
 - .2 Maximum allowable warpage: 1.6 mm in 915mm span or 4.75mm in 2438mm span.
- .3 Fabrication:
 - .1 Shop fabricate in longest practical lengths.
 - .2 Bond joints with highly chemical resistant cement with properties and color similar to base material.
 - .3 Provide 3.1mm drip groove at underside of exposed edges, set back 12.7mm from face.
 - .4 Finish exposed edges.
- .4 Fabricate tops flat with 6.35mm raised marine edge.
- .5 Edge treatment: Standard 3.1mm chamfered edge.
- .6 Corner treatment: exposed corners shall be eased slightly for safety.
- .7 Back and end splashes:
 - .1 Supplied loose for field installation.
 - .2 Same material and thickness as worksurfaces. [4 inches high unless otherwise indicated.
 - .3 Furnish loose end splashes where worksurfaces abut adjacent construction and locations indicated on Drawings.
- .8 Joints: Maximum 3.1mm bonded with epoxy grout.
- .9 Make joints between two benches level.
- .10 Locate joints away from sinks and over or near supports.
- .11 Allowable tolerances:
 - .1 Square: Plus or minus 0.4mm for each 305mm inches of length.
 - .2 Location of cutouts and drilled openings: Plus or minus 3.1mm of design dimension.
 - .3 Size of cutouts and drilled openings: Plus 3.1mm or minus 0mm.

2.10 CABINETS

- .1 Construct cabinet bodies of sheet metal, flanged and returned at exposed gables to receive flush mounted drawer fronts and doors.

- .2 Flange and set back top rails and bottom panels.
- .3 At base cabinets provide 38 mm long levelling screw for adjusting to floor variations, in gussets and accessible through plugged openings in bottom.
- .4 Provide removable backs, knee space panels or access doors where piping or wiring occur.
- .5 Provide continuous enclosed toe space in steel. Wall base by others.

2.11 DOORS

- .1 Door panels to be of flat front style.
- .2 Fabricate doors of double pan construction, 18 mm thick, telescoped inner pan into outer pan with exposed vertical edge formed into channel shape having returned lip over inner pan, offset to receive lip.
- .3 Use fibrous board or paper waffle sound deadener.
- .4 Provide reinforcement for hardware attachment to inner pan and conceal. Install hardware.
- .5 Bevel inside edge of cutout in front panel of glass door.
- .6 Set glass in continuous rubber gasket between panels.
- .7 Hardware: provide following:
 - .1 D-shaped wire pull approximately 100 mm L stainless steel.
 - .2 Alternate: door pull may be integrated with, or recessed into, door panel. Stainless steel only. To match drawer pull.
 - .3 5-knuckle hinges: Type 304 stainless steel .089 thick, 63mm high, with brushed satin finish, and shall be the institutional type with a five knuckle bullet type barrel. Hinges shall be attached to both door and case with two screws through each leaf. Welding of hinges to door or case will not be accepted. Doors under 914mm in height shall be hung on one pair of hinges, and doors over 914mm high shall be hung on 3 hinges.
 - .4 Locks:

.1 Disk Tumbler:

- .1 Locks when shown or called for shall be a 5-disc tumbler with heavy duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity for 2000 primary key changes. Master key one level with the potential of 10 different, noninterchangeable master key groups.

OR

.2 Pin Tumbler:

- .1 Locks when shown or called for shall be a pin tumbler with heavy duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity of at least 1000 primary key changes, and the capacity to be Masterkeyed, Grand-masterkeyed, Submasterkeyed, and Mason Keyed.

- .5 Elbow catches and strike plates shall be used on left hand doors of double door cases where locks are used, and are to be burnished cast aluminum, with bright brass finish.

2.12 DRAWERS

- .1 Drawer panels to be of flat front style.
- .2 Fabricate drawer fronts of double pan construction, 18 mm thick, telescoped inner pan.
- .3 Fill front panels with fibrous board or waffle paper.
- .4 Weld drawer bodies to front through flanges on sides and bottom, and back through flanges at rear.
- .5 Extend flanges outward or downward, top of side and back rolled. Cove corners to 12 mm radius.
- .6 Provide reinforcements for hardware and install finish hardware.
- .7 Hardware:
 - .1 Provide D-shaped wire pull approximately 100 mm L stainless steel.
 - .2 Alternate: drawer pull may be integrated with or recessed into, drawer panel. Stainless steel only. To match door pull.

2.13 SHELVES

- .1 Form shelves of steel sheet with front and rear edges flanged down 18 mm and hemmed back at 30 degrees to underside of shelf.
- .2 Support shelves with shelf clips inserted in slots in front stile and in formed channel in back.
 - .1 Shelf adjustment clips shall be nickel-plated steel.

2.14 FILLER PANELS

- .1 Provide filler panels where cabinets abut wall.
 - .1 Upper cabinets: return panel to wall on underside.
- .2 Provide filler panel above all wall cabinets at front edge. Extend to underside finished ceiling. Return end where ends are exposed.
- .3 Attach from inside of cabinet.

2.15 FINISHING

- .1 Prepare and finish cabinet components to provide surfaces free of defects including roughness, sharp edges, variations in colour, etc.
- .2 Grind and polish spot weld marks from exposed surfaces.
- .3 Immerse in hot alkaline to remove grease, oil, dirt and foreign matter.
- .4 Neutralize, wash, and apply metal pretreatment coating.
- .5 Apply primer, and bake at minimum 175 degrees C, to minimum dry film thickness of 0.02 mm.
- .6 Apply enamel and bake at minimum 212 degrees C to minimum dry film thickness of 0.18 mm.

2.16 PERFORMANCE REQUIREMENTS

- .1 Steel Casework Construction Performance:
 - .1 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.
 - .2 Base cabinet corner gussets with leveling bolts shall support 227 kg. per corner, at 38mm

projection of the leveling bolt below the gusset.

- .3 Each adjustable and fixed shelf 4 ft. or shorter in length shall support an evenly distributed load of 195kg. per square metre up to a maximum of 976kg., with nominal temporary deflection, but without permanent set.
- .4 Drawer construction and performance shall allow 343mm 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 68kg.
- .5 Swinging doors on floor-mounted casework shall support 91kg. suspended at a point 305mm 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.

.2 Steel Paint System Finish and Performance

Specification:

.1 Steel Paint System Finish:

- .1 After Cold Rolled Steel and Textured Steel component parts have been completely welded together and before finishing, they shall be given a pre paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals. After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall

then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance. The completed finish system in standard colors shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

- .2 Colours to be selected by Departmental Representative from manufacturers complete colour range. Product shall be available in a minimum of eight (8) colours.
- .2 Performance Test Results (Chemical Spot Tests):
 - .1 Testing Procedure:
 - .1 Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 32mm dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2 ounce wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of $25^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.
 - .2 Test Evaluation: Evaluation shall be based on the following rating system.
 - Level 0 - No detectable change
 - Level 1 - Slight change in color or gloss.

Level 2 - Slight surface etching or severe staining.

Level 3 - Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

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

.3 Test Reagents

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	Cotton ball & bottle
2.	Acetate, Ethyl	Cotton ball & bottle
3.	Acetic Acid, 98%	Watch glass
4.	Acetone	Cotton ball & bottle
5.	Acid Dichromate, 5%	Watch glass
6.	Alcohol, Butyl	Cotton ball & bottle
7.	Alcohol, Ethyl	Cotton ball & bottle
8.	Alcohol, Methyl	Cotton ball & bottle
9.	Ammonium Hydroxide, 28%	Watch glass
10.	Benzene	Cotton ball & bottle
11.	Carbon Tetrachloride	Cotton ball & bottle
12.	Chloroform	Cotton ball & bottle
13.	Chromic Acid, 60 %	Watch glass
14.	Cresol	Cotton ball & bottle
15.	Dichlor Acetic Acid	Cotton ball & bottle
16.	Dimethylformamide	Cotton ball & bottle
17.	Dioxane	Cotton ball & bottle
18.	Ethyl Ether	Cotton ball & bottle
19.	Formaldehyde, 37%	Cotton ball & bottle
20.	Formic Acid, 90%	Watch glass
21.	Furfural	Cotton ball & bottle
22.	Gasoline	Cotton ball & bottle
23.	Hydrochloric Acid, 37%	Watch glass
24.	Hydrofluoric Acid, 48%	Watch glass
25.	Hydrogen Peroxide, 3%	Watch glass
26.	Iodine, Tincture of	Watch glass
27.	Methyl Ethyl Ketone	Cotton ball & bottle
28.	Methylene Chloride	Cotton ball & bottle
29.	Mono Chlorobenzene	Cotton ball & bottle
30.	Naphthalene	Cotton ball & bottle
31.	Nitric Acid, 20%	Watch glass
32.	Nitric Acid, 30%	Watch glass
33.	Nitric Acid, 70%	Watch glass
34.	Phenol, 90%	Cotton ball & Bottle
35.	Phosphoric Acid, 85%	Watch glass
36.	Silver Nitrate, Saturated	Watch glass
37.	Sodium Hydroxide, 10%	Watch glass
38.	Sodium Hydroxide, 20%	Watch glass

39.	Sodium Hydroxide, 40%	Watch glass
40.	Sodium Hydroxide, Flake	Watch glass
41.	Sodium Sulfide, Saturated	Watch glass
42.	Sulfuric Acid, 33%	Watch glass
43.	Sulfuric Acid, 77%	Watch glass
44.	Sulfuric Acid, 96%	Watch glass
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	Watch glass
46.	Toluene	Cotton ball & bottle
47.	Trichloroethylene	Cotton ball & bottle
48.	Xylene	Cotton ball & bottle
49.	Zinc Chloride, Saturated	Watch glass

* Where concentrations are indicated, percentages are by weight.

.3 Performance Test Results (Heat Resistance):

- .1 Hot water (88°C - 97°C) shall be allowed to trickle (with a steady stream at a rate not less than 177mL per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.

.4 Performance Test Results (Impact Resistance):

- .1 A 0.45kg ball (approximately 50mm diameter) shall be dropped from a distance of 305mm onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.

.5 Performance Test Results (Bending Test):

- .1 An 18 gauge steel strip, finished as specified, when bent 180° over a 13mm diameter mandrel, shall show no peeling or flaking off of the finish.

.6 Performance Test Results (Adhesion):

- .1 Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1.6mm apart shall be cut with a razor blade to intersect at right angle thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed

lightly with a soft brush. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197 68, "Standard Method of Test for Adhesion of Organic Coatings".

.7 Performance Test Results (Hardness):

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

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install casework components plumb, true and level and securely fasten in place. Accurately scribe and closely fit components to irregularities of adjacent surfaces. Maximum gap opening 0.5 mm.
- .2 Install laboratory casework plumb with countertops level to 1.5 mm in 3 m.
- .3 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.
- .4 Level base cabinets by adjusting levelling screws.
- .5 Support wall cabinets on continuous galvanized steel hanging brackets secured to blocking in walls.
- .6 Bolt adjoining cabinets together, maximum width of joint 1 mm.
- .7 Apply continuous bead of sealant at junction of countertop and adjacent wall finish.
- .8 After installation, adjust operating hardware to

ensure proper and smooth function.

- .9 Where cabinet work abuts other building elements provide filler panels/strips to match cabinet work unless otherwise detailed.
- .10 Upon completion of installation inspect work of this Section and touch-up, where required, minor damaged surface finish to restore it to original condition. All other damaged components shall be replaced.

3.1 INSTALLATION - COUNTERTOPS

- .1 Install in accordance with manufacturer's instructions and approved Shop Drawings.
 - .1 Install tops plumb and level.
 - .2 Scribe to adjacent surfaces in accordance with manufacturer's recommendations.
 - .3 Fasten tops to supporting construction with adhesives appropriate for use with adjoining construction and as recommended by manufacturer.
 - .4 Form field joints using manufacturer's recommended adhesive. Form joints to be inconspicuous and nonporous.

3.2 PROTECTION

- .1 Protect installed products until completion of Project.
- .2 Touch up, repair, or replace damaged products.

3.3 CLEANING

- .1 On completion, touch up marred or abraded finished surfaces.
- .2 Wipe down surfaces to remove fingerprints and markings and leave in clean condition.

END OF SECTION