

LABORATORY CASEWORK

PART 1 GENERAL

1.1 DESCRIPTION OF WORK:

All laboratory casework, working surfaces and other items specified herein and shown on the drawings shall be furnished and installed and shall be demonstrated to properly perform in accordance with the functions specified herein. Provide all necessary fillers, scribes and miscellaneous accessories and hardware to provide a complete installation.

1.2 DELIVERY, STORAGE AND HANDLING

- A. Schedule delivery of casework and equipment so that spaces are sufficiently complete to allow for installation immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation. Protect all work surfaces from damage throughout construction period. Mark in large lettering "NO STANDING" to not allow standing on work surfaces during the construction period.

1.3 PROJECT CONDITIONS

- A. Do not deliver or install equipment until the following conditions have been met:
 - 1. Windows and doors are installed and the building is secure and weather tight.
 - 2. Ceiling grid, overhead ductwork, and lighting are installed.
 - 3. All painting is completed and sheet vinyl is installed.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each item of laboratory furnishings and equipment. Include component dimensions, configurations, construction details, joint details and attachments. Indicate location, size and service requirement for each utility connection.
- B. Shop Drawings:
 - 1. Provide 1 = 50 (metric) scale elevations of individual and battery of casework units showing cross sections, rough-in. Indicate relation of units to fume hoods, other laboratory equipment, walls, windows, doors and other building components.
 - 2. Provide one sets of prints.

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- C. Top Samples: Submit 100 mm (4") x 100 mm (4") product sample of each type of work surface.
- D. Hardware Samples: Provide samples of door and drawer pulls.
- E. Finish Samples: Submit 60 mm (2 3/8") x 100 mm (4") samples of casework finish from manufacturer.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Laboratory casework, work surfaces, Sinks, Electrical and Service Fixtures, and accessories specified as part of this section shall be furnished by a single laboratory furniture supplier. Proposals from brokers or multiple furniture suppliers will not be accepted.
- B. The supplier for work in this section shall use an established manufacturers production facilities including all tools, equipment and special machinery necessary for specializing in the fabrication and installation of the type of equipment specified, with skilled personnel, factory trained workmen and an experienced engineering department. Each shall have the demonstrated knowledge, ability and the proven capability to complete an installation of this size and type within the required time limits:
 - 1. Five years or more experience in manufacture of laboratory casework and equipment of type specified.
 - 2. Five installations of equal or larger size and requirements within the last five years.

1.6 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM B499 Test method for measurement of coating thickness
 - 2. ASTM 2794 Compliance of standard test method for resistance of organic coating to the effect of rapid deformation
 - 3. ASTM D3359 Measuring adhesion by tape test
 - 4. ASTM D522 Standard Test method for mandrel bend test of attached organic coatings
 - 5. ASTM D522 Standard practice for operating salt spray
- B. British Standard (BS):
 - 1. BS 3900 Paint. Film thickness
 - 2. BS 5411 Metallic and related coating. Measurement of coating thickness.
- C. Deutches Institute For Normung (DIN):
 - 1. DIN 17140 Specification for Steel. Cold rolled sheet. Quality.
 - 2. DIN 50981 Measurement of coating thickness
 - 3. DIN 53151 Test of adhesion of paint

PART 2 PRODUCTS

2.1 LABORATORY CASEWORK SYSTEMS

A. Manufacturer:

Design of steel laboratory casework is based on products manufactured by Advancelab (S) Pte Ltd. All casework shall be the product of one manufacturer. Products of equal manufacturer may be supplied provided they meet the product characteristics specified

For manufacturers not listed, submittal for approval must be to the Architect 10 days prior to bid. No exceptions.

B. Design Requirements:

1. Flush construction: Surfaces of doors, drawers and panel faces shall align with cabinet fronts without overlap of cabinet ends, top or bottom rails. Horizontal and vertical cabinet shell members shall meet in the same plane without overlap.
2. Back Panels: used for the entire length of the casework to enclose the rear portions of an area to cover the plumbing space.
3. Self supporting units: Completely welded shell assembly without applied panels at ends, backs or bottoms, so that cabinets can be used interchangeably or as a single, stand –alone unit.
4. Interior of mobile units: Easily cleanable, flush interior. Base cabinets, 1000 mm (39 3/8”), with double swinging doors shall provide full access to complete interior without center vertical post.
5. Drawers: Sized on a modular basis for interchange to meet varying storage needs and designed to be easily removable in field without the use of special tools.

C. Performance Requirements:

1. Structural performance requirements: Casework components shall withstand the following minimum loads without damage to the component or to the casework operation:
 - a. Suspended mobile units: 100 kg (220 lbs.)
 - b. Floor Mounted units: 250 kg (550 lbs)
 - c. Drawer in a cabinet: 25 kg (55 lbs.)
 - d. Hanging wall mounted cabinets: 75 kg (165 lbs.)
 - e. Load capacity for internal shelves of mobile and floor mounted units, wall mounted cabinets and tall cabinets: 30 kg (66 lbs.)
2. Metal Finish Performance Requirements: Refer to 2.1 C, Item 3, Performance Requirements.

D. Materials and Finishes:

1. Sheet Steel: Cold rolled steel electrostatically zinc coated.
2. Minimum gauges :

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- a. 0.8 mm (21 gauge): Interior and exterior panels, drawer and door fronts and backs (double wall), drawer body, cabinets top, end, bottom, base, back, utilities access panels, and internal cabinets shelves.
 - b. 1.5 mm (16 gauge): cabinet frame, table legs and frames, leg rails and drawer angle support.
 - c. 2 mm (14 gauge): Drawer guides, cabinet channel rail , cabinet skate
3. Glass (for glass display tall cabinets or glass display wall cabinets):
- a. 6 mm (1/4")
Glass (for shelf surface) :
 - b. 6 mm (1/4"), reinforced glass
Glass to be without imperfections or marred surfaces
4. Metal finish: Refer to 2.2 Metal Finish

E. Construction:

1. Mobile and Floor Mounted Units, Wall Mounted Cabinets and Tall Cabinets:
 - a. Mobile and Floor Mounted units and 600 mm (23 5/8") and 750 mm (29 1/2") high wall mounted cabinets: Front reinforced with lintel, back and side with rivet.
 - b. 2000 mm (78 3/4") tall cabinets : Front reinforced with lintel, back and side with rivet. Upper corner reinforcement.
 - a. Shelf : adjustable internal shelf system. Holes in back panel and front frame shall be perfectly aligned for level setting, 70 mm (2 3/4") up and down from the center.
 - b. Mobile and Floor Mounted unit backs: provide fixed backs at all drawer and cupboard units. The sink units shall have partial back panel to allow access of drain line and piping to the service chase.
2. Drawers:
 - a. Drawer fronts: 18 mm (11/16") thick, double wall construction, pre-painted prior to assembly and sound deadened; top front rounded.
 - a. Drawer bodies: Bottom, sides and back formed into one-piece center section with bottom and sides coved and formed top edges. Front panel riveted to center section.
 - b. Drawer suspension: Heavy duty coved guides for drawer with nylon tired, ball bearing rollers; self-centering and self-closing when open to within 100 mm (4") of the closed position.
 - c. Provide drawer with rubber bumpers. Friction centering devices are not acceptable.
 - d. File drawers: provide with full extension slides for full access and operation.
3. Doors:
 - a. Solid panel doors and Solid Swinging doors: 18 mm (11/16") thick, double wall, steel construction with interior pre-painted and sound deadened. Door panel reinforced 1.5 mm (19 gauge) where secure hinges are screwed. Hinges shall be removable; welding of hinges not acceptable. Doors shall close against rubber bumpers.

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- a. Unframed sliding glass doors: 6 mm (1/4") glass with pulls and bottom extruded aluminium track. 3 mm (1/8") thickness side track to prevent shock at fully opened and closed door position.
4. Adjustable Steel Cabinet Shelves:
 - a. Whole shelf 22 mm (7/8") thickness with PVC coating
 - b. Entire length of shelves: from 494 mm (19 7/16") for 500 mm (19 11/16") wide cabinets to 1093 mm (43") for 1200 mm (47 1/4") wide cabinets.
5. Hardware:
 - a. Drawer and hinged door pull handles: high chemical strength Polyamide. Glued on upper side of front panel.
 - b. Drawer and hinged door label holders: high chemical strength Polyamide. Glued on upper side of front panel.
 - c. Sliding glass door pulls: Rounded pull, high chemical strength Polyamide.
 - d. Hinges: 270° opening hinges; Nickel plated self-closing. Provide two hinges for doors up to 1052 mm (41 7/16") high; three hinges for doors over 1052 mm (41 7/16") high.
6. Mobile casework (suspended casework) : 450 mm (17 3/4") and 600 mm (23 5/8").
 - a. Provide finish back on all mobile cabinets (suspended cabinets).
 - b. Do not provide toe base on mobile cabinets (suspended cabinets).
 - c. All mobile cabinets (suspended cabinets).shall have tops except sink cabinets.
 - d. Hanging sliders: Two suspending cabinet brackets in polyamide of 12.5 mm (1/2") fixed to the reinforced steel cabinet frame.
 - e. Skate : One bracket with wheels at the bottom rear of the cabinet to permit total and effort less horizontal movement along the whole size bench without removal of working surface and without restriction or limitation of "C" frame leg assembly.
7. Floor mounted casework: entire cabinet 720 mm (28 3/8") height for sitting bench and 870 mm (29 1/5") height for standing bench.
 - a. Provide finish back on all fixed cabinets.
 - b. Cabinets height : 600 mm (23 5/8") and 750 mm (29 1/5")
 - c. Provide plinth of 120 mm (4 3/4") for fixed cabinets.

F. Metal Finish Performance:

1. Metal finish performance requirements:
 - a. Adherency : Excelent. Without any coating detachment.
 - b. Embutition Ericksen : Embutition of 7 mm. depth without any coating cracks.
 - c. Flexibility : No cracking or loss of adhesion at bend at 180°
 - d. Impact Resistance: Satisfactory with one bowl of 1 kg thrown from 30 cm to 60 cm height. No cracking
 - e. Salt environment : No visible effect to surface finish following 500 hour after application of NaCl (5% concentrated)
 - f. Humidity resistance: Withstand 1000 hour exposure in saturated humidity with no loss of adhesion or blistering.

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- g. Distilled water resistance: Withstand 240 hour exposure in distilled water at 40 degrees C.
 - h. Water vapors: No visible effect to surface finish following 1 hour continuous water vapors
 - i. Hot water: No visible effect to surface finish following 2 hours continuous boiled water.
2. Chemical resistance:
- a. Test procedure: Apply 10 drops (approximately 0.5 cc) of each reagent identified on the surface of the finished test panels laid flat and level on a horizontal surface. Ambient temperature: 68-72 degrees F (20-22 degrees C). After one hour flush away chemicals with cold water and wash surface with detergent and warm water at 140 degrees F (65.5 degrees C) and with alcohol to remove surface stains. Examine surface under 100 foot candles of illumination.
 - b. Evaluation ratings: Change in surface finish and function shall be described by the following rating:
 - (1) No effect: No detectable change in surface material.
 - (2) Excellent: Slight detectable change in color or gloss, but no change to the function or life of the working surface material.
 - (3) Good: A clearly discernable change in color or gloss, but no significant impairment of working surface function or life.
 - (4) Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period of time.
 - (5) Failure: Pitting, cratering or erosion of working surface material. Obvious and significant deterioration.
 - c. Minimum acceptable results (concentration by weight)

| <u>CHEMICAL</u> | <u>RATING</u> |
|-------------------------|---------------|
| Sodium Hydroxide, 10% | No effect |
| Sodium Hydroxide, 25% | No effect |
| Hydrochloric Acid, 37% | Excellent |
| Nitric Acid, 25% | Excellent |
| Nitric Acid, 60% | Good |
| Phosphoric Acid, 75% | Excellent |
| Sulfuric Acid, 28% | Excellent |
| Sulfuric Acid, 85% | Good |
| Ammonium Hydroxide, 10% | Excellent |
| Carbon Tetrachloride | No effect |
| Ethyl Acetate | Excellent |
| Acetone | Good |
| Ethyl Alcohol | Excellent |
| Ethyl Ether | Excellent |
| Acetic Acid, 93% | Good |
| Formic Acid, 33% | Good |
| Formaldehyde, 37% | Excellent |
| Hydrogen Peroxide, 5% | No effect |
| Methylethyl Ketone | Excellent |
| Phenol, 85% | Good |
| Xylene | Excellent |

2.2 SERVICE FIXTURES

- A. The fixtures shall be in accordance to B.S. 5750, B.S. 5412 & DIN and approved, long life, easy operation, easy cleaning and of high degree of flexibility and tested quality.
1. The surface to be plastic coating resistant to chemicals, heat and localized shut off, presenting and safety lock.
 2. Hot and cold water service fixtures: The fitting shall be one piece construction from brass and deck mounted. The surface coating shall be chemical resistant. The fitting shall be provide only at sink units using mixing faucets with gooseneck.
 3. Cold water service: The fitting shall be one piece construction from brass and deck mounted. Gooseneck fixture, provide for use with cup sinks shall be located considering the best manipulation.
 4. Gas, Compressed Air and Vacuum service: The fitting shall be one piece construction from brass. The surface coating shall be chemical resistant and heat, etc.
 5. Safety Shower with Eye Wash: The assembly shall consists of 10 inch shower head of ABS (cycolac) plastic or stainless steel, shower valve, bowl of ABS (cycolac) plastic or stainless steel, 10 inch size for eye wash with 2 sprays.
 6. Service Fixtures handles shall be color coded by type of service in accordance with DIN 12920

PART 3 EXECUTION

3.1 INSTALLATION

- A. Casework Installation:
 - 1. Install system in strict accordance with manufacturer's instructions.
 - 2. Set system components plumb, square, and straight with no distortion. Shim are required using concealed shims.

- B. Work Surface Installation:
 - 1. Where required due to field conditions and top material, scribe to abutting surfaces.
 - 2. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure joints in field, where practical, in the same manner as in factory, with dowels, splines, adhesive or fasteners recommended by manufacturer.
 - 3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.
 - 4. Abut top edge surfaces in one true plane. Provide flush joints. Not to exceed 3 mm (1/8") between top units at epoxy resin.

- C. Accessory Installation: Install accessories and fittings in accordance with manufacturer's recommendations. Turn screws to seat flat; not to drive.

3.2 ADJUSTING

- A. Repair or remove and replace defective work, as directed by Owner's Representative upon completion of installation.

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

3.3 CLEANING

- A. Clean shop finished casework, touch up as required, wipe down and broom clean interior and exterior of equipment.

3.4 PROTECTION OF FINISHED WORK

- A. Provide all necessary protective measures to prevent exposure of casework and equipment from exposure to other construction activity during installation.

- B. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.