

Part 1 General**1.1 Summary**

- .1 Unless otherwise indicated, follow the standards below when specifying Laboratory Casework. These standards are not intended to restrict or replace professional judgment.
- .2 The Project Manager will liaise with the end users for project specific needs. Consult with the Project Manager to obtain general layout and specific requirements.

1.2 Content

- .1 Are included in this section:
 - .1 Fixed casework;
 - .2 Flexible casework;
 - .3 Work surfaces (with or without integrated sinks);
 - .4 Drying racks;
 - .5 Ceiling service panels;
 - .6 Overhead service carriers.

1.3 Definition

- .1 Fixed casework has been the traditional system used in many laboratories. The work surfaces are mounted on top of base cabinet and drawer units at a fixed height. Plumbing, electrical and data services are concealed within the casework and connect at the floor, wall or ceiling by service columns. A service chase is required behind the base units.
- .2 Flexible casework is a modular system consisting of a standard length frame system on which height-adjustable benchtops and shelves are connected. Cabinet and drawer units are either suspended or on casters. Plumbing, electrical and data services can be factory-installed to quick connect to ceiling mounted service panels or overhead service carriers.

1.4 Related McGill Guidelines

- .1 Furniture (section 12 50 00)
- .2 Chemicals storage cabinets (section 12 35 54)
- .3 Fume hoods (section 11 53 13)
- .4 McGill EHS Laboratory Design Guidelines:
<http://www.mcgill.ca/ehs/laboratory/lab-design-guidelines>
- .5 McGill Laboratory Safety Manual:
<http://www.mcgill.ca/ehs/laboratory>
- .6 McGill Radiation Safety Policy Manual
<http://www.mcgill.ca/ehs/laboratory/radiation/manual/>
- .7 McGill Biosafety Manual:
<http://www.mcgill.ca/ehs/laboratory/biosafety/manual/>
- .8 McGill Laser Safety Manual:
<http://www.mcgill.ca/ehs/laboratory/laser-safety/laser-safety-manual>

1.5 Design Requirements

- .1 Coordination:
 - .1 Proper coordination of Mechanical and Electrical connections must be done from the preliminary design stage;
 - .2 Construction design of walls supporting wall mounted elements must take into account the combined SEFA (Scientific Equipment and Furniture Association) maximum testing loads capacity of all elements to be fixed to the fully loaded wall;
 - .3 All casework must be supplied by the same manufacturer;
 - .4 To offer maximum flexibility, laboratory casework arrangement should be planned considering long term usage and repurposing;
 - .5 Whenever possible, specify flexible casework;
 - .2 When used with fixed casework, suspended drawers and cabinets units are preferred. Maximize free under counter space;
 - .3 When used with flexible casework, mobile drawers and cabinets units are preferred;
 - .4 To offer maximum flexibility and interchangeability, minimize and standardize the widths of drawers and cabinets units.
- .2 Casework types:
 - .1 Metal casework;
 - .2 Melamine covered particleboard casework;
 - .3 Stainless steel casework (for animal facilities and in other areas with high humidity content);
 - .4 The use of melamine covered particleboard casework must be confirmed with McGill Design Services department beforehand. They must not be used in animal facilities or other high humidity areas.

1.6 Manufacturer / Installer Qualification

- .1 Manufacturer / Installer must be recognized as specializing in the manufacture and installation of Laboratory Casework, and:
 - .1 Be a member of SEFA (Scientific Equipment and Furniture Association);
 - .2 Have a 5 years' minimum experience in the industry;
 - .3 Have a proven track record of on time delivery and installation of projects of similar scale and type.

1.7 Warranty

- .1 Three (3) years manufacturer's warranty for material defects, faulty workmanship, faulty installation, faulty functioning, including replacing and in-shop refinishing.

Part 2 Products**2.1 Preferred Products**

- .1 The threshold level of compliance with the Furniture Emissions Evaluation standards listed in **01 84 19** Part 4 must be met by 100%.

- .2 For products with low VOC emissions that may contribute to LEED® v4 EQ Credit Low-Emitting Materials, refer to:
 - .1 SCS Global Services <https://www.scsglobalservices.com/certified-green-products-guide>
 - .2 Intertek <http://www.intertek.com/furniture/etl-environmental-voc-certified/>
- .3 Refer to **09 91 26** for preferred painting products, and **01 84 19** Part 2 for wet-applied products emissions evaluations.
- .4 For flexible casework, acceptable products: “Scala” by Waldner, “Symphony II” by Bedcolab, “Optima” by Mottlab or approved equivalent.

2.2 Performance

- .1 Conform to function-specific requirements;
- .2 Laboratory casework must meet or exceed SEFA requirements;
- .3 Laboratory casework must be tested according to SEFA’s procedures and;
- .4 A SEFA compliant *Laboratory Furniture Certificate of Performance* must be provided for each Laboratory casework element of the project;
- .5 Laboratory casework must have a costs life cycle of at least 20 years.

2.3 Materials

- .1 Pre-painted Furniture Grade Cold Rolled Steel (CRS) or Stainless Steel (SS) for all casework. Minimal metal gauges as follow:
 - .1 20 gauge (0,91mm/.036”CRS, 0,95mm/.038”SS): cabinet shelves 915mm (36”) long or less, drawers fronts and doors liners, removable back panels;
 - .2 18 gauge (1,21mm/.048”CRS, 1,27mm/.050”SS): side panels, filler panels, door fronts, bodies of drawers, cabinet shelves longer than 915mm (36”), open mounted shelves, drawer fronts, cabinet bottom, top space panels, shelves supports, front stiffeners, permanent back panels
 - .3 16 gauge (1,52mm/.060”CRS, 1,59mm/.063”SS): top and intermediate channels, legs, base cabinets rear rail, hinges and locks gusset plates
 - .4 14 gauge (1,90mm/.075”CRS, 1,98mm/.078”SS): drawers supports, hinges;
 - .5 11 gauge (3,04mm/.120”CRS, 3,13mm/.123”SS): structural brackets, levelers and hardware gusset plates, cabinets top rails;
- .2 Pre-painted galvanized steel for sink cabinets’ bottoms: 18 gauge (1.31mm/0,052”)
- .3 Paint finish: factory applied, chemical resistant thermosetting polyester enamel, sprayed applied by electrostatic process, and baked;
- .4 Stainless Steel: type 316, no 4 finish (satin);
- .5 Sealant: mildew and chemical resistant;
- .6 Glass: 6mm thick (¼”);
 - .1 Tempered: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3 or comparable standard;
 - .2 Laminated: Clear laminated tempered glass complying with ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality-Q3 or comparable standard; with clear, polyvinyl butyral interlayer;
 - .3 Grind smooth and polish exposed glass edges and corners;

- .7 Hardware: type 316 stainless steel;
- .8 Fasteners for interior and exterior: type 316 stainless steel, screws must be counter sink type, exposed fasteners are not acceptable;
- .9 Particleboard: ANSI A208.1, Grade M-2; ANSI A208.1, Grade M-2 or comparable standard, exterior glue at worktops (countertops);
- .10 Oriented Strand Board (OSB): DOC PS 2, Exposure 1 or comparable standard;
- .11 Adhesives: Containing no urea formaldehyde;
- .12 Edging for melamine-faced panels: 0.08 inch (2 mm) thick, polypropylene edging matching melamine-faced panels.

2.4 Construction requirements

- .1 Metal casework must be prefabricated with factory applied paint finish on all surfaces;
- .2 Metal casework must be all welded construction. All visible welds to be grounded to a smooth finish. Exposed welds in stainless steel elements must be polished to match no 4 finish;
- .3 All visible edges must be bend and all corners rounded (12mm radius);
- .4 Metal gusset and reinforcing must be concealed;
- .5 Screws and bolts are acceptable only if used on removable pieces;
- .6 Frames of casework must be rigid and fabricated to allow unit relocation and reconfiguration at any time.

2.5 Fixed casework

- .1 All parts and sub-assemblies (doors, drawers, drawers supports, dividing post, back panels, etc.) must be interchangeable, after installation, without requiring special tools;
- .2 Doors and drawers must be interchangeable within units of same dimensions e.g. one standard height drawer can be replaced by two half-drawers, a door can replace a drawers combinations, etc.;
- .3 Side panels and filler panels: one piece, no visible perforation or mechanical fasteners;
- .4 Double hinged doors cabinets must be free of a center post to allow full access inside;
- .5 Cabinet construction (each "box") must allow for adapting to different door and drawer combination by adding / removing center posts or other separators at any time after installation, without the need of additional perforations or modifications to the cabinet or the use of special tools;
- .6 There must be no exposed horizontal structural members between doors and drawers;
- .7 If free-standing base cabinets are used, cabinets, side panels and filler panels must be assemble to form a continuous, uninterrupted toe kick.
- .8 Casework assembly must take into account the vibrations of the table top equipment they will support.
- .9 Knee Space
 - .1 Must have a back panel and 102mm (4") channel apron for supporting the counter top;

- .2 If drawer required, to be full width x 102mm (4 ") high, and fitted with a full size under drawer removable panel;
- .3 Knee clearance must be at least 710mm (28") under work area;
Height of bench sections with knee space must be adjustable.
- .10 Base cabinet or drawer units:
 - .1 Modular units widths : 15" (380mm), 18" (460mm), 21" (535mm), 24" (610mm), 30" (760mm), 36" (915mm), 42" (1070mm), 48" (1220mm);
 - .2 Depths: 21" (535mm), 29" (740mm);
 - .3 Units 883mm (34 ¾") high: to accommodate four equal size drawers, each of these drawers must be interchangeable with two half-drawers;
 - .4 Units 730mm (28 ¾") high: to accommodate three equal size drawers;
 - .5 Drawers from 730mm (28 ¾") high units: to be interchangeable with those of 883mm (34 ¾") high units.
 - .6 Front vertical posts and internal structure: prepared to accommodate left or right hinges, sliding doors and any combination of drawers, doors and shelves;
 - .7 Rear vertical posts: pre-punched to accommodate any combination of drawers suspension tracks and shelves clips;
 - .8 Removable back panel covering the full back area: all base cabinets, including drawers units, removable without the use of tools, both sides paint finished.
 - .9 Sink cabinets back panels to be 227mm (9") high to accommodate plumbing needs;
 - .10 If waste bin units are provided, specify PVC bin liner inserts;
 - .11 Base cabinets arrangement must comprise rear services chase space of minimum 150mm (6") when against a wall, and 300mm (12") in island type configuration;
- .11 Suspended cabinet or drawer units:
 - .1 Legs of suspended units assembly: adjustable at 25,4mm (1") increments, from 730mm (28 ¾") high to 883mm (34 ¾"), at least 51 mm x 51 mm (2" x 2");
 - .2 Legs/Gable legs of suspended units assembly: fitted with 8mm x 38mm (5/16" x 1½") stainless steel adjustable leveling bolts.
- .12 Free standing cabinet or drawer units:
 - .1 Free standing base cabinet: fitted with four 8mm x 38mm (5/16" x 1½") stainless steel threaded bolt adjustable with a screwdriver from inside the cabinet, with nylon caps to cover hole after installation;
 - .2 Floor of free standing base cabinet: reinforced with a full size formed box welded to both sides and bottom of cabinet to accommodate the weight supported by the leveling bolts [14 gauge (1.7mm)];
 - .3 Base (toe-kick) of free standing cabinets: removable.
- .13 Cabinet doors:
 - .1 Standard hinged steel doors:
 - .1 20 gauge doors interior panels;
 - .2 18 gauge doors exterior panels;
 - .3 19mm thick (¾");
 - .4 Hinges: 64mm (2½"), 14 gauge, five knuckles high performance;

- .5 Catches: adjustable nylon roller catches to hold doors closed;
 - .6 Insulated with sound deadening material;
 - .7 Inside panel must be removable.
- .2 Standard sliding steel doors:
- .1 20 gauge doors interior panels;
 - .2 18 gauge doors exterior panels;
 - .3 19mm thick ($\frac{3}{4}$ ");
 - .4 Insulated with sound deadening material;
 - .5 Inside panel must be removable;
 - .6 Top hung with two nylon ball bearing rollers;
 - .7 Double PVC track at the cabinet bottom.
- .3 Standard hinged melamine-faced doors:
- .1 Thermoset melamine panels with particle board core;
 - .2 Polypropylene edgebanding on all exposed edges;
 - .3 Hinges: three knuckles, partially-concealed hinges (European Type): 270 degrees of opening, self-closing. Provide two for doors 48 inches (1200 mm) high or less, and provide three for doors more than 48 inches (1200 mm) high.
- .4 Framed glass hinged doors:
- .1 51mm x 19mm metal frame all around the glass;
 - .2 20 gauge doors interior panels;
 - .3 18 gauge doors exterior panels;
 - .4 19mm thick ($\frac{3}{4}$ ");
 - .5 Hinges: 64mm ($2\frac{1}{2}$ "), 14g, five knuckles, high performance;
 - .6 Catches: adjustable nylon roller catches to hold doors closed;
 - .7 Insulated with sound deadening material;
 - .8 Inside panel must be removable.
- .5 Framed glass sliding doors:
- .1 51mm x 19mm metal frame all around the glass;
 - .2 20 gauge doors interior panels;
 - .3 18 gauge doors exterior panels;
 - .4 19mm thick ($\frac{3}{4}$ ");
 - .5 Insulated with sound deadening material;
 - .6 Inside panel must be removable;
 - .7 Top hung with two nylon ball bearing rollers;
 - .8 Double PVC track at the cabinet bottom.
- .6 Sliding glass door (frame less):

- .1 Ground edges;
- .2 One 16mm x 76mm ($\frac{5}{8}$ " x 3") finger pull etched in the glass of each door;
- .3 Set in an extruded aluminum shoe with nylon wheels;
- .4 Top and bottom aluminum track in the cabinet.

.14 Drawers:

- .1 18 gauge construction;
- .2 Bottom flanges: bent upward to facilitate cleaning/decontamination;
- .3 Drawer sides: reinforced around the top edge by a 19mm flange;
- .4 Drawer dividers: construction permitting the installation of three dividers; specify one steel divider per drawer, bottom edge of divider to be fitted with a pvc edge guard;
- .5 Drawer fronts:
 - .1 18 gauge construction;
 - .2 19mm thick ($\frac{3}{4}$ ");
 - .3 Insulated with sound deadening material;
 - .4 Outside panel must be removable.
- .6 Support tracks:
 - .1 200lbs (91 kg) load capacity;
 - .2 Radiused 14 gauge type 304 stainless steel, construction to prevent metal to metal contact;
 - .3 Nylon rollers with steel ball bearings;
 - .4 Self-closing action for the last 152mm (6") of drawer travel;
 - .5 Integral stops to prevent inadvertent removal of drawer but designed to allow removal from full opened position;
 - .6 No side movement in full opened position;
 - .7 Cabinet must be designed to permit after installation replacement of self-closing tracks by full extension tracks.

.15 Shelves:

- .1 Cabinets' shelves:
 - .1 20 gauge: shelves 915mm (36") long or less;
 - .2 18 gauge: shelves longer than 915mm (36");
 - .3 Thermoset melamine OSB panels with polypropylene edgebanding on all exposed edges;
 - .4 Adjustable at 13mm ($\frac{1}{2}$ ") increments;
 - .5 Full width and depth of the cabinet interior;
 - .6 Supported by zinc plated shelf clips (4 per shelf);
 - .7 Open shelves (cabinets without doors) to have 12mm edge guards;
 - .8 1/360 maximum deflection when tested according to SEFA's procedure.
- .2 Open Shelves
 - .1 Depth: typical wall mounted depth is 300mm (12"). Not to exceed 355mm (14") for wall mounted and 450mm (18") for peninsula shelving;

- .2 Staggered depth shelves acceptable only if upper shelves are deeper than lower shelves;
 - .3 Specify brackets spaced not more than 915mm on centre;
 - .4 Cantilevered end of shelf: maximum 200mm (8");
 - .5 For flexibility, in the laboratory and between laboratories in the same building, preferred shelf length is 915mm;
 - .6 Open shelves must have a 12.7mm front edge guard and end guards of at least 100mm (4") high on all other open sides not adjoining a wall;
 - .7 1/360 maximum deflection when tested according to SEFA's procedure.
 - .8 Must be built to accommodate light valances at any time after installation, without the need of additional perforations or modifications to the shelves.
- .16 Wall mounted upper Cabinets:
- .1 Top front rail: 11gauge
 - .2 Front vertical posts and internal structure must be prepared to accommodate left or right hinges, sliding doors, and any combination of doors and shelves;
 - .3 Rear vertical posts pre-punched to accommodate any combination of shelves;
 - .4 Floor of cabinet must cover the full interior, be removable for accessing the wall fasteners and have flanges turned down on all sides;
 - .5 All cabinets must be supplied with a welded back panel, covering the full back area, and reinforced for anchoring to the wall;
 - .6 Must be built to accommodate light valances at any time after installation, without the need of additional perforations or modifications to the cabinet.
- .17 Light valances
- .1 Must be provided under shelves and wall mounted upper cabinets if under mount lights are specified.
- .18 Handles
- .1 Recessed, 100mm (4"), anodized aluminum for steel casework, stainless steel for stainless steel case work;
 - .2 Horizontal for drawers, vertical for doors;
 - .3 Two handles for drawers wider than 890mm (35");
 - .4 Matching building's existing laboratory casework whenever possible.
- .19 Locks
- .1 Factory installed, cam locks, keying as per the project requirements;
 - .2 Minimum two keys per lock and two master keys.
- .20 Drawer and door bumpers: black rubber.

2.6 Flexible casework

- .1 Support structure:
 - .1 Modular rear frame dimensions:
 - .1 Width: 48" (1220mm), 60" (1525mm), 72" (1830mm), 96" (2440mm);
 - .2 Rear and center uprights:
 - .1 11 gauge powder coated cold rolled or stainless steel;
 - .2 Center uprights to accommodate split shelving;
 - .3 Provide leveling glides.
 - .3 Upper and lower cross rails:
 - .1 11 gauge powder coated cold rolled steel or stainless steel.
 - .4 Load capacity: rear upright to support up to 3 shelves loaded to a maximum of 81 kg (180 lbs) per 300mm (12") deep shelf. The total load capacity for the rear upright is 245 kg (540 lbs).
 - .5 Uprights to house services, electrical and data cables
 - .1 High voltage cabling to be in a separate upright from gas piping
 - .6 Lower cross rail shall house an electrical circuit raceway.
- .2 Adjustable table:
 - .1 Dimensions:
 - .1 Width: 48" (1220mm), 60" (1525mm), 72" (1830mm), 96" (2440mm);
 - .2 Depth: 29" (737mm) or 35" (889mm);
 - .3 Height: adjustable from 29" (737mm) to 36" (915mm) excluding work surface.
 - .2 Table legs:
 - .1 Powder coated cold rolled or stainless steel telescoping leg;
 - .2 On leveling glides.
 - .3 Capable of vertical height adjustment in 1" (25mm) increments minimum;
 - .4 Capable of being fastened to the rear support structure;
 - .5 Capable to support the work surface plus minimum 100 lbs/linear ft. of table length up to a maximum load rating of 363 kg (800 lbs).
- .3 The construction requirements for cabinets, doors, drawers, shelves, light valances, handles, locks, and bumpers apply to the flexible casework units.
- .4 Adjustable shelves:
 - .1 Supported by the rear support structure;
 - .2 Depth: 12" (300mm) or 15" (380mm);
 - .3 Capable of vertical height adjustment in 1" (25mm) increments minimum;
 - .4 Open shelves must have a 1" (25mm) front edge guard.
- .5 Suspended cabinet or drawer unit:
 - .1 Suspended from the structural support rails under the adjustable table;
 - .2 Provide locking device to allow the units to move only laterally and not be removed from the structural support rails;

- .3 Installation and removal should not require the use of tools to allow for easy reconfiguration.
- .6 Mobile cabinet or drawer unit:
 - .1 On lockable casters;
 - .2 Casters shall be heavy-duty, swiveling-type, rated for 70 kg (154 lbs) minimum each;
 - .3 Ensure a clearance of 64mm between the top of the cabinets and the underside of the table frames.
- .7 Plumbing fixtures:
 - .1 Rear upright structure to support plumbing fixtures;
 - .2 Fixtures: needle valve style, with a single serrated hose end;
 - .3 Plumbing lines: 1/4" (6mm) copper tubing running the length of the upright;
 - .4 Burning gas tubing: in stainless steel;
 - .5 Quick disconnect at the top of the upright;
 - .6 Cannot have intermixing of services;
 - .7 All service valves and quick disconnect shall be keyed and color coded. Only plug and body connects of the same key will couple and allow flow.
- .8 Electrical raceways:
 - .1 Powder coated steel raceway full width of the structural frame;
 - .2 Minimum 2 electrical outlets per table side, and minimum 1 under the work surface;
 - .3 Wiring for the electrical outlets must be separated from plumbing and data cables.
- .9 Service connections:
 - .1 Electrical, data and plumbing services shall terminate at the top of the rear support upright;
 - .2 Electrical services shall have a twist lock plug with a cord extending minimum 1220mm (4') above the top of the upright;
 - .3 Data services shall have a male plug extending minimum 3000mm (10') above the top of the upright.

2.7 Work surfaces

- .1 Generalities:
 - .1 Continuous, with no open seams;
 - .2 Edges: with marine type edges
 - .3 Drip groove: continuous beneath the overhang, 3.2mm x 6.4mm (1/8" x 1/4") at 12,7mm (1/2") from the edge of the work surface;
 - .4 Joints in surfaces: sealed, liquid proof, no less than 600mm (24") from sink or ends;
 - .5 Joints in surfaces must be aligned on center of the work surface's supports;
 - .6 Support spacing at maximum 1200mm (48");
 - .7 Back-splash : at all junctions with walls, integral with surface, 102mm (4"), sealed joint to wall;
 - .8 Backsplashes for sink benches: at wall junctions behind the sink, backsplashes should cover the full wall height between the wall cabinets, or shelves, above the

sink bench and the sink bench itself. When there are no cabinets or shelving above the sink bench, the backsplash behind the sink must be at least 18" (457mm) high. In all instances, backsplashes on the walls behind the sink must correspond to the sink width plus at least 100mm on either side of the sink.

- .9 Grommet in work surfaces are not acceptable;
- .10 Fixed utilities (gas, vacuum, etc.) through work surfaces are not acceptable.

.2 Material

- .1 The chosen material for work surfaces shall be compatible with the laboratory applications and provide appropriate impact, chemical, abrasion and wear, and moisture resistance.
- .2 Stainless steel:
 - .1 Steel hat channel construction, gauge 16, with sound deadening sealer applied to the underside;
 - .2 Surface stiffeners: stainless steel, 16 gauge;
 - .3 Backsplash integrally formed with the work surface, apparent thickness must be 19mm ($3/4$ ");
 - .4 Mechanical joints to be avoided. If long sections require mechanical joints because of site condition and transport, joint should be liquid proof.
- .3 Epoxy resin (baked):
 - .1 Thickness: 25.4mm (1");
 - .2 Marine edges 32mm ($1\frac{1}{4}$ ");
 - .3 Welded joints;
 - .4 19mm ($3/4$ ") integrated back-splash.
- .4 Solid phenolic resin:
 - .1 Thickness: 19mm ($3/4$ ") to 25mm (1");
 - .2 With surface applied tapered marine edges in epoxy resin 6mm ($1/4$ ") thick;
 - .3 Sealed joints;
 - .4 19mm ($3/4$ ") integrated back-splash.

2.8 **Drying racks**

- .1 Back-panel: Wall-mounted over a sink, in materials compatible with lab applications: stainless steel, epoxy or phenolic resin.
- .2 Drying rods :
 - .1 152mm x 9.6mm (6 " x $3/8$ ");
 - .2 Fixed from behind the back panel at a 30 degrees angle;
 - .3 White polypropylène;
 - .4 With sealing gasket for fixation and back panel joint waterproofing.
- .3 Bottom edge gutter :
 - .1 Type 316 stainless steel, 14 gauge;
 - .2 Sloped for water drainage;
 - .3 With drain and drain adaptor for pipe to the sink;
 - .4 Fixed to the back panel from behind the panel.

2.9 Ceiling service panels

- .1 Provide a means to mount and disconnect quick connect service fixtures, electrical and data outlets;
- .2 Powder coated 16-gauge steel panel with factory-punched cutouts for service ports;
- .3 Flush mounted with suspended ceiling T-grid structures but independently secured to the building structure;
- .4 Gas services outlets shall be keyed quick-disconnect inlet plugs, compatible with the specified gas service hose as specified;
- .5 Electrical devices shall be provided with a twist lock preventing plugs from becoming loose.

2.10 Overhead service carriers

- .1 Provide quick and simple access to services such as electrical, data, telephone, local exhaust system, integrated lighting, and plumbing services (vacuum, gases, water);
- .2 Horizontal service chase tied into the ceiling deck and suspended below the suspended ceiling t-grid. Consult a structural engineer when required;
- .3 Heavy-duty vertical uprights with enclosed support structure for horizontal service carrier, capable of housing plumbing, electrical and data lines;
- .4 Units must be modular and capable to be linked in tandem for a continuous service run;
- .5 Horizontal chase must be supplied with quick connects and disconnects for services;
- .6 Specify removable end covers and hinged top covers for access to services and dust prevention;
- .7 UL approved and factory installed junction boxes for electrical and data outlets;
- .8 Factory-punched cutouts for service ports;
- .9 Factory-painted chemical resistant powder paint finish;
- .10 Installation height shall provide minimum 2100mm clearance underneath the lowest point.

Part 3 Installation**3.1 Casework installation**

- .1 The cabinets and countertops must be levelled (1.5mm/3m (1/16" in 10'-0") maximum deviation tolerance);
- .2 Cabinets must be fixed to one another;
- .3 All cabinets junctions with walls (horizontal and vertical) and floor must be sealed and liquid proof;
- .4 Casework must have seismic stabilization and anti-tilt anchoring.

3.2 Overhead service carriers installation

- .1 The bottom of the service carriers must be levelled (1.5mm/3m (1/16" in 10'-0") maximum deviation tolerance);

- .2 Anchor overhead service carriers to the underside of structural elements with appropriate mounting hardware, as per manufacturer and/or structural engineer's specifications.

END OF SECTION