

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM A653 / A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A1008 / A1008M-20, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- .2 National Electrical Manufacturers Association (NEMA).
 - .1 NEMA LD 3-2005, High-Pressure Decorative Laminates (HPDL).
- .3 Underwriters Laboratories Canada (ULC)
 - .1 ULC C1275-2014, Flammable Liquid Storage Cabinets.
- .4 Scientific Equipment and Furniture Association (SEFA)**
 - .1 SEFA 2-2010, Installation of Scientific Laboratory Furniture and Equipment.**
 - .2 SEFA 3-2010, Work Surfaces.**
 - .3 SEFA 7-2010, Laboratory and Hospital Fixtures.**
 - .4 SEFA 8M-2010, Laboratory Grade Metal Casework.**
 - .5 SEFA 10-2013, Adaptable Lab Furniture Systems.**
- .5 American Chemical Society (ACS)**
 - .1 American Chemical Society Symposium Series 1272-2018, Accessibility in the Laboratory.**

1.2 SUBMITTALS

- .1 Refer to Section 01 33 00 -Submittal Procedures for requirements and procedures.
- .2 Product Data: Drawings to include data and details for construction of the laboratory furniture and information regarding the name, quantity, type and construction of materials (such as hardware and gauges), that will be used to complete the project.
- .3 Shop Drawings:
 - .1 Furnish shop drawings illustrating the layout and placement of all laboratory furniture, casework and fume hoods as well as products included in this section.
 - .2 Indicate the type and location of service fittings and associated supply connections.
 - .3 Include roughing-in information for mechanical, plumbing, and electrical connections.
 - .4 Preparation instructions and recommendations.

- .5 Storage and handling requirements and recommendations.
- .6 Installation methods.
- ~~6.7~~ **Drawings showing wheelchair accessibility within the laboratories.**

- .4 Submit the following selection samples:
 - .1 Three complete sets of colour chips representing the manufacturer's full range of available colours. Minimum sample size 50 mm x 76 mm.
- .5 Quality Assurance:
 - .1 Design Data / Test Reports: Submit test data and design criteria in compliance with project specifications.
 - .2 Certificates: Certifications required in the specifications to be submitted with the original submittal package under separate cover. Certificates to be provided with the signature of a qualified individual of the supplier.
 - .3 Manufacturer's Instructions: Provide manufacturer's instructions for installation and maintenance of products provided and installed within this section. Instructions to be in bound form, tabbed and organized by section number.

1.3 QUALITY ASSURANCE

- .1 Manufacturers Qualifications: The following list of information to be provide to the Department Representative at least 10 days before bid opening:
 - .1 List of manufacturing facilities;
 - .2 A list of 10 installations of comparable stature completed within the past 5 years;
 - .3 Construction details depicting the materials, sizes and methods of construction:
 - .4 Independent laboratory test reports that include information on cabinet, fume hood and table top finish and performance that have been conducted within the last 2 years.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Packaging, Shipping, Handling and Unloading:
 - .1 Packaging: Products to have enough packaging to protect finished surfaces from soiling or damage during shipping, delivery and installation.
 - .2 Delivery: Casework delivery to only take place after painting, utility rough-ins and related activities are completed that could otherwise damage, soil or deteriorate casework in installation areas.
 - .3 Handling: Care, such as the use of proper moving equipment and experienced movers to be always used to avoid damaging the casework. Until installation takes place, any wrapping, insulation or other method of protection applied to products from the factory to be left in place to avoid accidental damage.

- .2 Acceptance at Site: Casework to not be delivered or installed until the conditions specified under Part 3, Installation section of this document have been met.
- .3 Storage: Casework to be stored in the area of installation. When, before installation, it is necessary for casework to be temporarily stored in an area other than the installation area, the environmental conditions to meet the environmental requirements specified under the Project Site Conditions article of this section.

1.5 PROJECT SITE CONDITIONS

- .1 An operational HVAC system that maintains temperature and humidity at occupancy levels to be in place.
- .2 Adjacent and related work to be completed.
- .3 Ceiling, overhead ductwork and lighting to be installed.
- .4 Site must be free of further construction such as "wet work".
- .5 Required backing and reinforcements to be installed accurately and the project to be ready for casework installation.

1.6 WARRANTY

- .1 Furnish a written warranty that Work performed under this section to remain free from defects as to materials and workmanship for a period of 2 years from date of shipment. Defects in materials and workmanship that may develop within this time to be replaced without cost or expense to the Departmental Representative. Defects include but are not limited to:
 - .1 Ruptured, cracked, or stained coating.
 - .2 Discolouration or lack of finish integrity.
 - .3 Cracking or peeling of finish.
 - .4 Slippage, shift, or failure of attachment to wall, floor, or ceiling
 - .5 Weld or structural failure.
 - .6 Warping or unloaded deflections of components.
 - .7 Failure of hardware

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: Mild steel, cold rolled furniture grade to requirements of ASTM A1008 / A1008M, Grade C or higher, with smooth surfaces to furniture quality.
- .2 Galvanized Sheet Steel: quality galvanized sheet steel to ASTM

A653 / A653M, Designation Z275.

- .3 Stainless Steel:
 - .1 Sheet: ASTM A240 / A240M, Type 304 AND 316 alloy.
 - .2 Finish: Unless otherwise indicated, No. 4 Brushed finish.
- .4 Glass: safety glass conforming to CGSB12.1-2017, Type 1 with clear PVB interlayer. Total nominal thickness of laminated glass: 6 mm.
- .5 Laminates: to NEMA LD 3.

2.2 DESIGN REQUIREMENTS

- .1 Support systems to be a core and panel style support structure.
- .2 Core structure can be supported by anchoring to suitable flooring material or may be supported by structural end gables (outrigger legs).
- .3 Modular components to be suitable for single faced wall cores or double-faced peninsula or island configuration.
- .4 Core assemblies to have removable panels on all sides.

2.3 COMPONENTS

- .1 General: Refer to drawings for component configuration.
- .2 Worksurface Adjustable Table Frame: Constructed of cold-rolled steel tubing, with telescoping inner leg, and leg levelers. Height adjustable from 762 to 940 mm including 25 mm thick top, on 50 mm increments. Provide mobile cabinet stop under worksurface frame. Depth and length indicated.
 - .1 Four-Post: Adjustable height table frame for stand-alone applications.
 - .2 Material: Cold rolled; tubular welded steel, powder coat finish
- .3 Worksurface Mobile Table Frame: Cart assembly with cart frame and cantilevered table frame. Height adjustable from 762 to 940 mm including 25 mm thick top, on 25 mm increments. Provide mobile cabinet stop under worksurface frame. Depth and length indicated Cabinets.
 - .1 Load Rating per Cart: 600 kg
 - .2 Heavy-duty locking casters
 - .3 Stationary Feet: Stationary feet with levelers.
 - .4 Supplementary Adjustable Legs: Pair of hinged supplementary adjustable legs to increase the load bearing capacity
 - .5 Back-to-Back Fastener: Brackets attached to cart uprights to stabilize two carts that are placed back-to-back.
 - .6 Side-to-Side Fastener: Brackets attached to cart uprights to stabilize two carts that are placed side-to-side.

- .7 Material: Cold rolled; tubular welded steel, powder coat finish
- .4 Cabinets: Suspended sink unit, below-counter mobile cabinets, and upper cabinets.
 - .1 General:
 - .1 Inset construction, with doors and drawers in same plane as cabinet face frame, without overlap.
 - .2 Materials: Typical: painted metal construction.
 - .3 Doors and drawers: reinforced double pan construction with sound deadening material, 20 mm minimum thick, square edged.
 - .4 Provide reinforcement for hardware attachment on doors and drawer front to inner pan.
 - .5 Drawers: one-piece body. Provide nylon roller channel suspension with front rollers set into drawer channels. Case channels shall maintain alignment of drawer and provide an integral drawer stop to prevent inadvertent removal of drawer.
 - .6 Shelves: one piece, adjustable at 13 mm oc.
 - .2 Sink Unit Cabinets: Suspended.
 - .3 Below-Counter Mobile Storage Units: Refer to drawings for door / drawer configurations, depth, height and width indicated, complete with heavy-duty locking casters 113 kg capacity per caster, finished metal top, and anti-tip devices. On drawer units, provide integral lock allowing only one drawer to be open at a time. Provide docking clips on underside of counter for fastening mobile units.
 - .4 Above-Counter Upper Cabinets: Refer to drawings for door configurations, and sizes.
 - .1 Complete with 2 adjustable steel shelves.
 - .2 Finish to match support structures.
 - .3 Hinged framed doors with 6 mm thick tempered glass.
 - .4 Provide wall rails for mounting cabinets on vertical uprights of frame assemblies.
 - .5 Provide wall mounted brackets and wall rails for mounting cabinets installed above tables without a rear frame assembly with vertical uprights, or above open floor space.
 - .5 Specialty Cabinets: construct cabinets from painted steel. construction as indicated.
 - .1 Acid Storage Cabinets:
 - .1 Exterior finished as specified for adjacent cabinets, with moulded corrosion-resistant polyethylene lining, with coved corners, and 50 mm lip at front of cabinet opening to contain spills.
 - .2 Provide flush front top panel, above two doors; removable back panel with 2 vent holes; one full depth perforated stainless steel shelf.
 - .3 Provide polyolefin vent pipes to vent storage

- cabinets.
- .4 Colour: selected by Departmental Representative.
Printed message on doors "CORROSIVES".
- .5 Size: indicated.
- .2 Flammable Liquid Storage Cabinets: Listed to UL 1275, and FM approved and labelled, complete with 2 50 mm pipe threaded vent outlets with sealed fire baffles, rear access panel, three-point lock on doors, and means for attaching grounding wire on exterior at base of cabinet.
 - .1 Double wall construction, minimum 1.21 mm cold rolled steel, with 38 mm inner space.
 - .2 Adjustable shelving. Non-vented: meet OSHA standards as organized storage for flammable and combustible liquids and comply with NFPA 30 for flammable and combustible liquids.
 - .3 Colour: selected by Departmental Representative.
Printed message on doors, in English and French "FLAMMABLE - KEEP FIRE AWAY".
 - .4 Size: indicated.
- .6 Accessories:
 - .1 Filler panels: same finish as base cabinets.

2.4 SUSPENDED OVERHEAD SERVICE CARRIER

- .1 General:
 - .1 Horizontal service chase, suspended from the slab for delivery of plumbed, wired and exhaust services vertically from ceiling to workstations below.
 - .2 Heavy-Duty vertical uprights.
 - .3 Carrier body to serve as a service chase for all cabling, plumbing, electrical conduit, light fixtures and localized exhaust ductwork.
 - .1 Modular units to be suitable for floor-mounted cabinets, freestanding tables and mobile equipment racks.
 - .2 Equipped with easy to remove entry covers for ease of utility access, visual inspection and utility shut-offs.
 - .4 System requirements:
 - .1 Modular units to be linked in tandem for a continuous service run.
 - .2 Horizontal chase to be supplied with quick connects and disconnects for mobile bench
 - .3 Service carrier can be suspended at height indicated above specified work surface to free workspace of service fixtures, electrical and teledata outlets.
 - .5 Carrier body and inside / outside access covers shall be

fabricated from 0.81 mm cold rolled steel.

- .6 Carrier body shall incorporate UL approved, factory installed junction boxes for electrical and teledata outlets. Electrical and teledata outlets to be field installed.
- .7 Carrier body shall also incorporate factory punched and plugged service ports. Service fixtures to be field installed.
- .8 Finish: Chemical resistant powder paint finish in manufacturer's standard colour to be selected.
- .9 Carrier horizontal section to be equipped with removable top covers to provide a flat upper surface capable of supporting storage cabinets.

.2 Carrier body:

- 1. Nominal overhead service carrier dimensions:
 - .1 Width: 1220 mm
 - .2 Depth: 610 mm
 - .3 Height: 215 mm
- 2. Capable of vertical adjustment in 25 mm increments.
- 3. Interior service bracket: Support bracket of 14-gauge cold rolled steel that can accept attachment brackets for copper and conduit service lines.
- 4. Carrier body end covers to be provided only when end of overhead service carrier is exposed.
- 5. Carrier bottom to be smooth without removable panels and to be punched as required to accept lighting, plumbing and local exhaust mounting. Carrier angled sides to be equipped with removable access panels held in place with plastic friction catches.
- 6. Lamp assemblies shall consist of 50 watt halogen recessed fixtures. Total quantity shall be 1220 mm unit:2
- 7. Lamp assemblies can be rebulbed by a bottom removal of the fixture assembly. Accessibility from the body interior is not acceptable.
- 8. Load bearing capabilities:
 - .1 Total overhead service carrier plus 180 kg per unit.

.3 CEILING POST ASSEMBLIES

1. Vertical structural support: 16-gauge cold rolled vertical shall integrate a slotted standard to cantilevered components.
2. Ceiling gusset assemblies include a set of 2 gussets to provide a means to attach to the ceiling deck or structural support.
Ceiling gusset to be an integral part of the vertical support and to be 11-gauge cold rolled steel.
3. Optional filler panel assemblies shall provide an umbilical chase between the ceiling plenum and horizontal chase.
4. A set of two optional filler panels to enclose the space between the ceiling posts.

.4 FINISHES

- .1 Pretreatment: After assembly, clean surfaces of grease, dirt, oil, flux, and other foreign matter by physical and chemical means. Treat entire unit with metallic phosphate process leaving surfaces with uniform, fine-grained, crystalline phosphate coating.
- .2 Top Coats: One coat high-bake primer followed by one or more coats of high-bake chemical-resistant enamel, to provide a hard and smooth, satin lustre finish, applied to treated surfaces. All surfaces, including hidden, shall be coated.
- .3 Colours: Colours to be selected by Departmental Representative from manufacturer's complete line of standard finishes.

2.5 LABORATORY SINKS

.1 Sinks, General:

- .1 Equip laboratory sinks with tailpieces, cross strainer, plug and overflow unless otherwise indicated.
- .2 Cove inside corners and pitch bottom to drain outlet.
- .3 Outlets: 38 mm diameter, 150 mm minimum length, fabricated of same material as sink. Provide strainers at outlets.
- .4 Overflows: standard beehive or open top design and with separate strainer. Height 50 mm less than sink depth. Provide in same material as sink.
- .5 Sink Schedule: Refer to drawings for location, size, and quantities of sinks.

- .2 Stainless steel sinks: minimum 1.52 mm thick Type 316 stainless steel sheet, No. 4 finish. Radius inside to 5 mm cove and pitch bottoms to drain inlet. Provide sound-deadening material on underside of sinks.
- .1 Where stainless steel sinks occur in stainless steel worksurfaces, provide sink welded integrally into worksurface, without seams or joints.
- .2 Provide sloping drainboard on one side of sink with 1:100 slope.
- .3 Epoxy Resin Cup Sink: oval, epoxy resign cup sink with self rim lip.

2.6 GLASSWARE DRYING RACK (PEG BOARDS)

- .1 Constructed of minimum 0.953 mm thick Type 304 stainless steel, No. 4 finish, with 50 mm deep integral drip trough, 915 mm clear drain hose, fifteen 150 mm long by 12 mm dia. polypropylene pegs, and wall mounting brackets. Size: as indicated.

2.7 LABORATORY SERVICE FITTINGS

- .1 General: plumbing service fixtures connect to fittings in tubular upright of frame assembly. Media key and colour code service valves and quick connects.
- .2 Metals: minimum 80% red brass alloy for valve bodies.
 - .1 Use solid brass bar stock or specially selected alloys for assembly components and operating parts such as valve stems, renewable seats and needle cones.
- .3 Completely enclose spring mechanisms.
 - .1 Design compression and needle valve stems to operate inside and make them replaceable.
 - .2 Include needle valves with stainless steel floating needles and removable seats.
- .4 Include fittings with wall flanges, shanks, lock nuts, couplings, nuts and tailpiece
- .5 Plumbed Services:
 - .1 Overhead Service Carrier: copper tubing for compressed air, water and gas as specified in Section 22 61 13 - Compressed-Air Piping for Laboratory Facilities, Section 22 11 16 - Domestic Water Piping and Valves, and Section 22 63 13 - Gas Piping and Equipment for Laboratory
- .6 Identify fittings as to type of service with coloured plastic removable type buttons with engraved lettering and following colour coding.

SERVICE	LETTERING ENGLISH	COLOUR CODING
Cold Water	CW	Green
Process Chilled Water	PCWS/R	White
Compressed Air	AIR	Orange
Nitrogen	N	Blue
<u>Argon</u>	<u>A</u>	<u>White</u>

- .7 Finish exposed parts of service fittings with chemical resistant clear epoxy finish.

2.8 ELECTRICAL FITTINGS

- .1 Duplex receptacles, NEMA No. 5 20R, 125 VAC, 20 A, T-slot, U ground, with the following features:
- .1 Heavy duty industrial grade.
 - .2 Suitable for #10 AWG back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Triple wipe brass contacts and non-riveted grounding contacts.
 - .5 Aluminum yokes, blades or terminals or with CU/AL rating will not be accepted.
 - .6 Impact resistant thermoplastic nylon cover and body.
- .2 Colour of receptacles:
- .1 White: general use normal power.
 - .2 Red: emergency power.
 - .3 Blue: uninterruptible (UPS) power.

PART 3 - EXECUTION

3.1 INSTALLERS

- .1 Installer Qualifications:
- .1 Installer shall have a minimum of 5 years continued experience in installation or application of systems like those required for this project.
 - .2 Installer to be authorized by either the distributor or manufacturer. Warranty will be void if unauthorized installer executes the installation.

3.2 EXAMINATION

- .1 Site Verification of Conditions:
- .1 Building to be enclosed (windows and doors sealed and weather tight).
 - .2 An operational HVAC system that maintains temperature and humidity at occupancy levels to be in place.

- .3 Ceiling, overhead ductwork and lighting to be installed.
 - .4 Site to be free of any further construction such as "wet work".
 - .5 Required backing and reinforcements to be installed accurately and the project to be ready for casework installation.
- .2 NOTE: In the event that any of the specified requirements for installation are not present at the time of requested delivery, the general contractor or owner to provide the casework manufacturer with a letter of deviation that releases the manufacturer from responsibility or liability from damage to the products resulting from the unfavourable building conditions.

3.3 INSTALLATION

- .2 Casework Installation:
- .1 Casework to be set with components plumb, straight and square, securely anchored to building structure with no distortion. Concealed shims to be used where required.
 - .2 Cabinets in continuous runs to be fastened together with joints flush, uniform and tight with misalignment of adjacent units not to exceed 1.5 mm.
 - .3 Wall casework to be secured to solid material, not lath, plastic or gypsum board.
 - .4 Top edge surfaces to be abutted in one true plane. Joints are to be flush and gap to not exceed 3 mm between tops units.
 - .5 Casework and hardware to be adjusted and aligned to allow for accurate connection of contact points and efficient operation of doors and drawers without any warping or binding.
- .3 Countertop Installation:
- .1 Countertops are to have been fabricated in lengths according to drawings, with ends abutting tightly and sealed with corrosion resistant sealant.
 - .2 Tops will be anchored to base casework in a single true plane with ends abutting at hairline joints with no raised edges at joints.
 - .3 Joints to be factory prepared having no need for infield processing of top and edge surfaces.
 - .4 Joints to be dressed smoothly, surface scratches removed and entire surface cleaned thoroughly.

3.4 CLEANING

- .1 Ensure products are unsoiled and match factory finish. Remove or repair damaged or defective units.

- .2 Clean finished surfaces, including drawers and cabinet shelves, and touch up as necessary.
- .3 Countertops to be cleaned and free of grease or streaks.

3.5 PROTECTION

- .1 Counter tops and ledges to be protected with 6 mm ribbed cardboard for the remainder of the construction process.
- .2 Examine casework for damaged or soiled areas; replace, repair, and touchup as required.
- .3 Touchup, repair or replace damaged products before Substantial Completion.