

# Laboratory casework – *Forte Flush Overlay line*

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## 1.0 General

### 1.1 Conditions

### 1.2 Scope of work

1. This section covers all materials, equipment, tools and labor for the supply and installation of laboratory furniture and all required accessories, as shown on drawings and as specified below.
2. **Works Include:**
  - a. Steel casework
  - b. Fume hood base cabinets
  - c. Counter tops, splash back and shelves
  - d. Sinks, cup sinks and faucets (water, air, vacuum, gas)
  - e. Electrical outlets and pedestals.
  - f. Emergency showers and eye-washes
  - g. Storage shelving
3. **Works exclude:**
  - a. All mechanical and electrical connections.
  - b. Cabinet base cove molding

### 1.3 References

1. *Standard NFPA 30 - Flammable and Combustible Liquids Code.*
2. *OSHA applicable standards.*
3. *SEFA 8 M-2010 – Recommended Practices for Metal Laboratory Furniture, Casework, Shelving and Tables.*

### 1.4 Shop drawings

1. Shop drawings shall include :
  - a. Location of all cabinets in plans and elevations.

- b. Details of laboratory casework construction and dimensions including section views.
- c. Location of plumbing service fittings and electrical outlets to be supplied with the cabinets.

### 1.5 **Qualifications**

1. These specifications are based on **Bedcolab**'s products and shall be used as the minimum quality criteria.
2. The sub-contractor must be a recognized laboratory furniture manufacturer with a minimum of 5 years experience in the industry. They shall also have ISO-9001-2000 accreditation and their products must meet all recommended practices of the "Scientific Equipment & Furniture Association" (SEFA).
3. The Contractor must demonstrate and prove its ability to produce and install projects of similar sizes and delay.
4. All Contractors must obtain pre-qualification from the Architect prior to tender limit, based on sections 1.5.2 and 1.5.3. In addition, the Contractor will be required to supply the following:
  - a. A typical cabinet with one drawer and one door
  - b. A product catalogue
  - c. A copy of the ISO- 9001-2000 certificate

### 1.6 **Warranty**

1. The Contractor must certify, in writing, that all components of the laboratory furniture included in this section are guaranteed for a period of three year starting on the date of completion of its work.
2. The Guaranty document as well as a Maintenance manual must be given to the owner within 15 days following the date of achievement of his work.

### 1.7 **Products handling**

1. The manufacturer must provide proper packaging of the products in order to ensure the integrity of the products up to the final destination.
2. The minimum packaging must correspond to the following: each cabinet must be covered with a plastic wrap and then fixed to a wood pallet, cabinets may be stacked a maximum of two cabinets high, and each assembly covered with cardboard and a plastic wrapping.

3. All counter tops must be protected with cardboard, after their installation, until the final inspection of this work.

## **2.0 PRODUCTS**

### **2.1 Materials - Generalities**

1. Commercial Quality Cold Rolled Steel sheets as per ASTM A366-85, class 1.
2. Stainless Steel sheets, type 316 with # 4 satin finish, as per ASTM A167-96.
3. Polished glass as per CAN/CGBS-12.3, 6 mm (1/4") thickness
4. Polished laminated glass as per CAN/CGSB.12.1, first quality, 6 mm (1/4") total thickness.
5. Silicone sealant for moisture resistance, Dow Corning # 786, black, clear or white and / or black chemical resistant sealant Dow Corning # 999 according to needs.

### **2.2 Steel cabinet Construction**

1. The laboratory furniture shall be constructed as per *Bedcolab's Forte Flush Overlay Casework System*.
2. The minimum metal gauges used in the fabrication of the casework shall be the following as recognized per North American standards:
  - a. 11 gauge (3.2 mm), for top front rails of the cabinets
  - b. 14 gauge (1.7 mm), for all leveling devices & drawer suspension tracks.
  - c. 20 gauge (1.0 mm), for all drawer boxes, drawer front's interior and exterior panels and the door's interior panels.
  - d. 18 gauge (1.2 mm), for all the other cabinet's component including cabinet frames, doors and shelves.
3. The cabinets shall have successfully passed all required physical and chemical resistance testing per SEFA 8M-2010 specifications. Contractor shall supply proof of test results.
4. Casework shall feature all welded construction. All cases shall be rigid and self-supporting and fabricated to allow individual unit relocation at any time. Screws and bolts are acceptable only if they are to be used on removable pieces.
5. All welds shall be ground smooth. Spotweld will not be noticeable.

6. Each unit shall have non-exposed top front and bottom rails to assure the rigidity of the cabinet. The vertical posts and the horizontal rails must form a rigid, square assembly to house the doors and drawers. Doors and drawer fronts must fit over the cabinet structure leaving a 1/8" maximum space between the drawer/door faces and cabinet sides. The fit of the doors and drawers should be such to prevent a sight line within the cabinet and to prevent dust penetration.
7. The side panels of the cabinet including front and back vertical rails must be formed in one piece. All front vertical posts shall be pre-punched to accommodate left or right door hinging as well as any combination of drawers, doors and shelves. In addition, front vertical rails shall be reinforced with a U shaped channel for added strength. All rear vertical posts shall be pre-punched to received drawer suspension tracks and shelf clips.
8. All parts and sub assemblies including the doors, drawers, drawer suspension tracks, front center posts and removable back panels, shall be interchangeable in the field without requiring special tools.
9. Each corner under the cabinet floor shall be provided with a 5/16" (8 mm) diameter steel threaded bolt type leveling device adjustable by a slot screwdriver from inside the cabinet. Black nylon caps shall be supplied to cover holes after installation. In order to properly support the weight that will be placed on the leveler, a full depth formed box shall be spot welded to the side wall as well as the bottom of the cabinet.
10. All double door cabinets must be free of a center post, to permit full access to the storage area. The cabinet shall be constructed in such a way as to allow the retrofitting of a center post so that different door and drawer combinations can be installed.
11. All base cabinets shall be provided with a continuous 4" (102 mm) high by 3" (51 mm) deep toe space along the entire working area.
12. The front top portion of the side panels shall be welded to an 11 gauge "u" shaped channel to form a rigid square assembly to properly support the counter top.
13. No exposed horizontal structural members between doors and drawers shall be accepted.
14. Perforations or mechanical fixations are not permitted on visible cabinet sides.
15. All base cabinets, with the exception of the drawer units, shall be supplied with a back panel which shall be removable, without the use of tools. Back panels shall extend full height and width between the structures of the cabinet. Sink cabinets shall have a partial back panel, 9" (227 mm) high, to accommodate plumbing requirements.

16. All cabinet boxes must be fabricated to permit any future arrangement of doors and drawers. Front center posts or any other separators must be removable or can be added at any time, without having to make additional perforations or modifications to the cabinet.

**17. Shelving :**

- a. Shelving shall be Cold Rolled Steel. Edges shall be turned down on all four sides  $\frac{3}{4}$ " (19 mm) and shall return under on front and back  $\frac{3}{4}$ " (19 mm).
- b. Shelves shall be adjustable on  $\frac{1}{2}$ " (13 mm) increments and shall be full depth and width of the interior.
- c. Each shelf shall be supported by four zinc plated shelf clips.

**18. Doors :**

- a. Hinged metal doors shall consist of an inner and outer panel (painted inside and out) with sound deadening material covering the entire inside surface of the door.
- b. The two top corners of the doors must be welded the full thickness of the doors and ground smooth.
- c. The inside panel shall be removable and be mechanically fastened to the front panel by two fasteners at the bottom of the door to form a rigid  $\frac{3}{4}$ " (19 mm) thick door with no vibrations during the opening and the closing of the door.
- d. Hinged side shall be reinforced adequately to ensure firm fastening and prevent sagging.
- e. Recessed black PVC or aluminum handles or wire pulls must be installed in the upper section of the door opposite the hinges, to permit an easy and natural opening.

**19. Drawers :**

- a. The drawer bottom flanges shall be bent upward on four sides for easier cleaning.
- b. Drawer fronts shall consist of an inner and outer panel (painted inside and out) with a sound deadening material covering the entire inside surface of the drawer front.
- c. The outside panel shall be removable and be mechanically fastened to the front panel to form a rigid  $\frac{3}{4}$ " (19 mm) thick door.

- d. Drawer sides shall be structurally reinforced around the top edge by a ¾" (19 mm) return flange with a ¼" (6 mm) seam bend to the inside. The front and back drawer panels shall be reinforced by a ¾" (19 mm) flange all around and shall be welded to the sides to form a rigid drawer unit.
- e. Drawers shall operate on 1" (25 mm) diameter nylon wheels with steel ball bearings. One such wheel shall be on each drawer slide and one on each drawer suspension track.
- f. Drawer tracks shall be designed to prevent metal to metal contact and shall incorporate a self closing action for at least the last 7" (178 mm) of drawer travel.
- g. The drawer slides shall have built-in stops to prevent inadvertent removal of the drawers and shall be designed so that the drawers can be removed from full open position by lifting the front of the drawers and pulling out. The closing action of the drawers shall be cushioned by two rubber bumpers and the drawers shall be so designed as to operate freely and quietly even when loaded.
- h. One recessed black PVC or aluminum handle or a wire pull shall be supplied in the center of the front of each drawer, except for drawers 30" (762 mm) or wider which require two pulls.
- i. The cabinets must be designed to permit the addition of full extension drawer tracks in replacement of the self closing tracks, without any modifications to the cabinets. This addition must be possible after the installation.

## **20. Filler Panels**

- a. All filler panels between cabinets or walls shall be fabricated with the same material and finish as the cabinets.
- b. Filler panels shall be flanged 1" (25 mm) on one side and flat on the other, to be cut on job site to suit wall conditions, and shall fit into double angles secured to the wall. No visible mounting screws permitted.
- c. Corner filler panels shall be a two piece construction, one fixed panel and the other a floating panel to accommodate room dimensions. Each shall have return flanges and an integral 3" x 4" (76 mm x 102 mm) toe space filler to interlock with the adjacent cabinet.
- d. Front filler panels shall be fabricated complete with return flanges on both sides and a 3" x 4" (76 mm x 102 mm) toe space along the working face.

## **21. Knee space Assembly :**

- a. The knee space between two cabinets shall consist of a channel shaped metal skirt 4" (102 mm) high supporting the counter top and a full width service cover panel to enclose the pipe space.
- b. If a knee space drawer is required it will consist of a 4" (102 mm) all welded construction skirting panel. The drawer shall use the same drawer tracks as the standard base cabinets.
- c. The service cover panel shall be designed in three sections. The lower and upper sections shall be fixed in place on each side to the back of the base cabinets. The middle section shall be fitted between the base cabinets and hanged from the upper section and kept in place with a magnet strip on the lower section.

## **22. Gable Legs :**

- a. Gables may be used in lieu of base cabinets to support counter tops. They shall consist of an inner and outer panel formed and welded to provide a strong rigid unit.
- b. All gables shall be 1 1/4" (31 mm) thick with a 3" x 4" (76 mm x 102 mm) toe space and equipped with two 5/16" (8 mm) diameter threaded bolt type steel levelers as in standard base cabinets.

## **23. Leg Sets :**

- a. Leg Sets may be used in lieu of base cabinets to support counter tops. They consist of two 2" (51 mm) square metal tubular legs, a steel channel shaped skirting panel 4" (102 mm) high on top as well as a 1" x 2" (25 mm x 51 mm) steel tube centered 8" (204 mm) up from the bottom of leg. All components are welded together to form a strong rigid unit.
- b. The leg sets are equipped with two 5/16" (8 mm) diameter threaded bolt type steel levelers as in standard base cabinets.

## **24. Wall Storage Cabinets :**

- a. All wall storage cabinets shall be made of Cold Rolled Steel and built using the same construction as the standard base cabinets.
- b. Cabinet sides, bottom and top shall be 18 gauge (1.2 mm) steel panels with the same

construction detail on the front edge as the standard base cabinets.

- c. Back panel shall be flanged 1/2" (13 mm) on all four sides and spot welded to cabinet sides, bottom and top. Back panel shall be reinforced with two hat section channels welded vertically at 5" (125 mm) from each side and have two vertical rows of holes at 1/2" increments for shelf support clips.
- d. The cabinet floor shall cover the full interior width and depth with return flanges turned down on all four sides. This panel shall be removable for easy access to wall fastenings.
- e. Shelves shall be Cold Rolled Steel 3/4" (19 mm) thick with all four sides turned down and shall have a 3/4" (19 mm) return flange on the front and back. Shelves shall be adjustable at 1/2" (13 mm) increments and shall be full depth and width of interior. Four zinc plated clips per shelf shall be provided.
- f. The wall storage cabinets should permit the addition of all of the following kinds of door arrangements without any modifications to the cabinet. Cabinets can be supplied open on the front or with the following types of doors:
  - i. Sliding glass doors shall be 1/4" (6 mm) glass fitted to a "W" shaped extruded aluminum shoe running the full width of door bottom. Shoe shall be provided with two nylon wheel assemblies. The door assembly shall run on an inverted "W" shaped extruded aluminum track. One finger pull 5/8" x 3" (16 mm x 76 mm) per door shall be ground into glass on side of door.
  - ii. Sliding metal doors shall be the same construction as the doors on the standard base cabinets but shall be guided at the bottom with a full width aluminum track and a black nylon track on top.
  - iii. Hinged metal doors shall be the same construction as the doors on the standard base cabinets.
  - iv. Hinged glass doors shall be 1/4" (6 mm) glass with a 2" x 3/4" (51 mm x 19 mm) metal frame all around the glass.

## **25. Acid Storage Cabinets:**

- a. Acid storage cabinets shall be of the same construction as the standard Forte Inset base cabinets, with a one piece white chemical resistant polyethylene (HDPE) interior box and doors lined with the same material 1/4" (6 mm) thick. Two integral shelf position supports are located on each side of the box. The bottom is equipped with



an integral 1” high edge to prevent leakage to the exterior of the cabinet.

- b. Air grills are provided at top and bottom of each door for air circulation.
- c. Each unit comes with an adjustable double-wall white chemical resistant polyethylene (HDPE) perforated shelf with stainless steel hat channel reinforcement.
- d. Each unit is labelled "ACIDS" or “CORROSIVES” for clear identification.
- e. All interior hardware is made of chemical resistant plastic.

**26. Flammable Solvents storage cabinets :**

- a. Construction shall meet *O.S.H.A. Standard 1910-106(d)(3)*, comply with the *NFPA Flammable and Combustible Liquids Code No. 30* and shall be UL 1275 certified.
- b. They shall be made of 18 gauge (1.2 mm) thick Cold Rolled Steel with double wall construction with fire proof insulation in all walls, floor and top. The floor shall be made of galvanized steel and be recessed 2" (51 mm) below the front opening of the cabinet. The four corners will be welded to form a liquid-tight well.
- c. The cabinets shall be equipped with four 5/16" (8 mm) diameter threaded bolt type steel levelers as on the standard base cabinets.
- d. The back of each cabinet shall be supplied with two 1 1/2" (38 mm) fire baffle vents.
- e. Each cabinet shall be equipped with an adjustable galvanized 16G (1.5 mm) steel shelf with a 2” increment.
- f. Each cabinet shall be clearly identified as such with the inscription *FLAMMABLE - KEEP FIRE AWAY*
- g. Doors shall overlap cabinet frame and have a full length piano hinge with a fire resistant gasket all around the door opening for a tight closing. Handle shall have a three point locking mechanism.

**27. Pump cabinets:**

- a. Pump cabinets shall be of the same construction as the standard Forte Inset base cabinets, with a double painted steel perforated lining with sound deadening insulation covering the back, the 2 sides and the top of the cabinet pump area.

- b. The cabinet shall be equipped with a pull out pan on full extension slide arm with a 200 lbs capacity installed at the bottom of the cabinet.
- c. The cabinet shall also include the following electrical components with the required wiring to a junction box located at the back of the cabinet:
  - i. One duplex electrical outlet 15A/125V located on the inside back of the cabinet.
  - ii. One pump switch located on the exterior top panel of the cabinet.
- d. The cabinet should also have a 2" diameter vent port located at the top left corner of the cabinet's back and a 1 1/2" pipe on the back right side of the cabinet top for end user piping.

**28. Tables :**

- a. Tables shall consist of two leg sets welded to front and back 4" (102 mm) apron sections to form a rigid unit.
- b. One or more drawers can be installed into the apron of the tables. The construction and hardware of the drawer shall be the same as the standard base cabinets and knee space units.
- c. Each leg shall be equipped with four 5/16" (8 mm) diameter threaded bolt type steel leveler.

**29. Glassware Drying Base Cabinets - Electric Heat :**

- a. This cabinet shall be constructed the same as the standard Forte Inset base cabinets but with the specific intent of drying laboratory glassware.
- b. All cabinets shall be supplied with a thermostatic control complete with sensitive bulb and neon pilot light. The strip heater controls shall be set to produce a maximum temperature of 185° F (85°C) inside the cabinet.
- c. The whole of the interior shall be lined with 1/4" (6 mm) thick composition cement board sheeting.
- d. Each cabinet shall be equipped with an adjustable perforated stainless steel shelf.

**30. Furniture Hardware:**

- a. **Flush finger handles:** all handles for hinged and sliding metal doors and drawers shall be one of the following options:
  - i. Extruded black PVC 4" (102 mm) long set flush within thickness on door and drawer front panels.
  - ii. Extruded aluminum 4" (102 mm) long set flush within thickness on door and drawer front panels.
  - iii. Chrome wire pulls 4" x 2"
  - iv. Stainless steel wire pull 4" x 2"
- b. **Glass door handles:** one finger pull 5/8" x 3" (16 mm x 76 mm) per door shall be ground into glass on side of door next to cabinet frame.
- c. **Hinges :** Door hinges shall be 14 gauge (1.9 mm) steel, five knuckle type screwed into door and fastened to cabinet side with two counter sunk 8-32 stainless steel screws. Hinges shall be one of the following options:
  - i. Black baked enamel finish
  - ii. Chrome finish
  - iii. Stainless steel
- d. **Door catches:** Shall be adjustable zinc plated steel spring loaded, nylon roller, and model number 950 by *Canaropa*.
- e. **Strike plates:** shall be made of steel and part of the structure of the cabinet.
- f. **Levelers:** Levelers at the four cabinet corners shall be cadmium plated hex head 5/16" (8 mm) machine screws 1 1/2" (38 mm) long slotted on threaded end for screwdriver adjustment. Levelers can be supplied, as an option, with white nylon glide caps. *Cluthe # 805*
- g. **Press plugs:** Press plugs for cabinet floors shall be black nylon, *Cords # DP875*.
- h. **Shelf clips:** Shelf clips shall be Roll-It # 101 with a zinc finish.
- i. **Drawer and hinged door bumpers:** Drawer and hinged door bumpers shall be black rubber, tongue type press fit bumper. Two bumpers per door or drawer. *3M # SJ-5003*.
- j. **Drawer tracks:** shall be one of the two following options:
  - i. 75% opening self closing **Bedcolab** model # DT002 with 7" (178 mm) self-closing feature – 150 lbs capacity
  - ii. 100% full extension opening – 200 lbs capacity

- k. **File drawer tracks** or on drawers over 36" long: shall be full extension type, zinc finish. Weight capacity is 200 lbs per pair of slides. The drawer slide must be installed in such a manner that drawer can be easily removed from cabinet without the use of tools.
- l. **File hanger rods:** shall be made of painted steel 1/8" x 3/4" (3 mm x 19 mm) and shall be adjustable to accommodate legal or letter size files.

### 31. Steel Furniture Finish:

- a. When fabrication of unit is completed, all surfaces shall be free of scratches, spot weld marks or material imperfections. Welds will be ground smooth where necessary. The unit will be washed using a three stage iron phosphate process for proper surface preparation, and subsequently dried in a dry off oven to remove all traces of humidity.
- b. A high quality chemical resistant polyurethane paint will then be applied to all surfaces including the interior of door and drawer panels using an electrostatic spray process. The parts will pass through a baking oven for the duration and temperature as recommended by the paint manufacturer. Painted surfaces shall conform to A.A.M.A. 2603.
- c. The painted surfaces shall meet or exceed the SEFA 8 specification for chemical resistance as specified by the "Scientific Equipment and Furniture Association" and shall contribute to LEED credits.
- d. **Technical Performance :**
  - i. Adhesion to substrate: 100% 5B (ASTM D3359)
  - ii. Hardness: 3H (ASTM D3363)
  - iii. Gloss: 60 +/- 5 units on 60°
  - iv. Flexibility: ¼" Conical Mandrel (ASTM D522)
  - v. Impact resistance: 100 in-lb direct: 100 in-lb reverse (ASTM D2794)
  - vi. Corrosion resistance: 1000 hrs less 1/16" in creepage over B-1000 treated test panels (ASTM B117)
  - vii. Humidity resistances: 1000 hrs no blistering over B-1000 treated test panels (ASTM D2247)
- e. **Colors:** Twenty colors are available per the *Bedcolab* color chart. Cabinets may be painted in one solid color or a two color scheme may be applied, where all cabinet bodies are painted one color and the doors and drawers are painted a second color.