

**SECTION 10 56 13.16 - POST-AND-SHELF METAL STORAGE SHELVING**

\* ALL FIELDS IN [ ] MUST BE EDITED

**PART 1 - GENERAL**

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Related Specifications Sections, apply to this Section.

1.2. SUMMARY

- A. This section includes the following:
  - 1. Four-Post fixed shelving units, fabrication and installation including leveling.
- B. Related Work, Not Furnished:
  - 1. Structural floor system capable of supporting loads required by prevailing building codes, including loads of storage units to be installed. Provide a maximum allowable sub floor deflection of L/480 under specified storage loads.
- C. Related Sections:
- D. Allowances:
- E. Alternates

1.3. PERFORMANCE REQUIREMENTS

- A. Due to the user's preference and requirements for safety, performance, and flexibility, all following specification line items are mandatory.
- B. Seismic Performance: Provide fixed shelving capable of withstanding the effects of earthquake motions as determined according to IBC 2006 and local building codes.
- C. Design Requirements: All shelving elevations as [per attached drawings] or [described in the specifications].
- D. Color Samples: Provide sample for each exposed product and for each color required.
- E. Selection Samples: For selection of colors and textures, submit manufacturer's color charts consisting of actual product samples, showing full range of colors and textures available. Vendors must provide a minimum of 12 color selections in powder coat paint finish.
- F. Installer Qualifications: Engage an experienced installer who is the manufacturer's authorized and certified representative.
  - 1. Minimum Qualifications: 1-year experience installing systems of similar size and complexity to specified project requirements
  - 2. Manufacturer Certification: Required by manufacturer on manufacturer's letterhead required at time of bid. Certifications by sales representatives, dealers, or distributors are unacceptable. Qualification must include resume of certified installation supervisor.
  - 3. Provide support within 24 hours for service call.
- G. Warranty: Submit a written warranty, executed by contractor, installer and manufacturer, agreeing

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to repair or replace units that fail in materials or workmanship within the specified warranty period. This warranty shall be in addition to, not limitation of other rights the owner may have against the contractor under contract documents.

Lifetime Limited Warranty: The entire shelving installation will be warranted against defects in materials for the life of the installation from the date of acceptance by the Owner.

- H. Reference List: Provide a list of three (3) minimum fixed storage installations to be contacted or visited by owner, architect and contractor. Installation must be of similar size, scope of specified system. Visit is intended to inspect operation, quality of installation and verify the suitability of manufacturer's products and comparison with materials and products specified. Manufacturer is required to address all issues raised by owner, architect and contractor. List must include contact names, phone numbers or e-mails, size and quantity of shelving units.
- I. LEED Data: Provide complete environmental data included recycled material content, VOC data, and other product related information. Describe all manufacturing processes or policies that contribute to environmental sustainability
- J. Project Schedule: Provide a project achievement plan detailing all critical elements necessary to plan, manufacture, ship, and install shelving product. Include critical project milestones and risk mitigation plan.
- K. Manufacturer Qualifications:
  - 1. ISO 9001:2008: Engage an experienced manufacturer who is ISO 9001:2008 certified for the design, production, installation and service of powered mobile systems. Submit manufacturer's ISO 9001:2008 quality system registration certificate.
  - 2. ISO 14001:2004: Engage an experienced manufacturer who is ISO 14001:2004 certified. This international standard defines a process for monitoring and improving an organization's environmental performance. This process minimizes adverse impacts on the environment caused by the activities of the enterprise and helps to continually improve the environmental performance of the organization. Submit manufacturer's ISO 14001:2004 registration certificate, certifying the environmental performance of manufacturer.

### 1.4. SUBMITTALS

- A. Product Data: Submit manufacturer's product literature, schematics, testing data, and other items as described in this specification. Include data substantiating that products to be furnished comply completely with requirements of the contract documents and specifications. Include installed weight, load criteria, furnished specialties, and accessories.
- B. Shop Drawings: Prepared and detailing fabrication, assembly, and installation of storage shelving, as well as procedures and diagrams. Include details of layout and installation, as well as clearances, spacing, relation to adjacent construction in plan, elevation, and section, components, assemblies, connections, attachments, reinforcements, and anchorage. Furnish floor layouts, technical, and installation manuals for every unit shipment.

### 1.5. QUALITY ASSURANCE (Submittals due from all bidding contractors at time of bid, failure to do so shall be cause for disqualification.)

- A. Manufacturer Certifications: Provide written certification by manufacturer on manufacturer's letterhead at time of bid required stating compliance with all specifications of shelving systems. Shelving certifications must confirm compliance with all shelf sizes and gauges as noted in these specifications.

### 1.6. PROJECT CONDITIONS

- A. Field Measurements: Verify shelving unit location by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction

progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating shelving units without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.
- B. Delivery, Storage, & Handling: Comply with instructions and recommendations of manufacturer for special delivery, storage and handling requirements.
- C. Sequence & Scheduling: Sequence storage shelving system installation with other work to minimize possibility of damage and soiling during remainder of construction period.
- D. Pre-installation Conference: Conduct conference at project site. Review methods and procedures related to installation of fixed storage units including, but not limited to, the following:
1. Inspect and discuss condition and levelness of flooring and other preparatory work performed under other contracts.
  2. In addition to the Contractor and the installer, arrange for the attendance of the following :
    - a. Other installers affected by the work of this section.
    - b. The Owner's representative.
    - c. The [Architect] [Architect/Engineer] [Engineer/Architect] [Engineer] [Designer].
    - d. Manufacturer's representative.

## **PART 2 - PRODUCTS**

### **2.1. MANUFACTURERS**

- A. General: Products are based on fixed shelving units products manufactured by Montel Inc. Contingent on meeting all specification requirements, other acceptable manufacturers may be included.

### **2.2. MANUFACTURED COMPONENTS – FOUR-POST SHELVING**

- A. Upright frames: Upright frames are made of two welded cross members to form a rigid rectangular structure. Each post must be made of 16-gauge 1 ¼" x 1 ½" rectangular shaped cold rolled steel. The posts are slotted on 3 sides (1" increment on the 2 sides and 1 ½" increment on the back). The slots are 3/16" wide x 5/8" long and are designed to accommodate a variety of shelf and accessories. Due to aesthetic concerns, user's performance requirements, safety of users and stored materials and to provide maximum flexibility, "L&T" shelving style are unacceptable.
- B. Cross members: Cross members are 4" high x 1/2" wide. They are made of 16-gauge steel folded to create a "U" shape channel. Bottom cross members are slotted in order to give adjustability to the kick strip.
- C. Levelers: Each post shall have an integrated leveler, inserted into formed upright tube, which allows for ¾" adjustment to accommodate for uneven floor surface. No temporary shims or other third party leveling device will be accepted.
- D. Center back panel [optional on double face sections]: Center back panels are made of 20-gauge steel and constructed in such a way as to form an integral finished product.
- E. Full-back panel [optional for single sections]: Full-back panels are made of 20-gauge steel box

formed 1/2" thick and affixed to the post to form an integral finished product.

- F. Shelf End Bracket: Made of 16-gauge steel with top and bottom faces flanged. Brackets have two (2) hooks and one (1) safety lug to engage the column slots and permit easy adjustment while ensuring the safety of the user. The bracket design allows for shelf adjustment upward or downward (i.e. walking the shelf) without disturbing adjacent shelves.
- G. Shelves:
  - 1. All shelves shall be constructed of minimum 18-gauge steel with "Four Bend" 3/4" edge construction and clipped on the uprights with use of shelf end brackets. No raw steel edge shall be visible or felt under each shelf's surface. Welded reinforcement can be added to accept heavier loads. Shelves floating on support are unacceptable (1" thick shelf with 3 bends also available). No portion of shelf storage capacity can be obstructed or otherwise blocked by support posts (i.e. – shelves must be installed between uprights for maximum unimpeded usage.)
  - 2. All shelving shall be back-to-back shelves and must be designed in a manner that will allow removal of shelves and accessories without the use of tools or otherwise disruptive actions. Shelves must have the ability to be individually added, removed, or adjusted without disrupting or otherwise impacting adjacent shelves' placement.
  - 3. To provide maximum flexibility, all shelves must be adjustable on 1" centers along the entire height of upright.
  - 4. Maximum deflection under load; must maintain L/140 based on a uniform distributed load of 50 pounds per square foot.
- H. Sway brace: 1 1/8" wide sway braces are made of two 16-gauge steel bars, assembled with a rivet. Sway braces are connected to the posts by means of mechanical rivet or dowel pins.
- I. Canopy Top: Rolled formed 20 gauge steel, with "Four Bend" 3/4" edge construction which adds additional strength and capacity as well as it creates a hidden safety edge to protect people and items. Canopy tops required on all sections.
- J. Kick Plate: Shall be 16-gauge steel, one (1) piece construction, 3" high. The top and base faces shall be flanged 1/2". Sides shall be design to provide a vertical adjustability.
- K. End panels: Shall be constructed of 20 gauge steel, 2" thick, they are bolted to bottom and top upright cross members.
- L. Side closure panels (optional): Shall be constructed of 20-gauge steel, they are formed to be flush with the edge of the shelving upright and bolted to bottom and top upright cross members.
- M. Plain back stops (single entry): Shall be 5 17/32" high formed of 20-gauge steel with a 3/8" bend on top and bottom and a 1 3/16" bend on each side.
- N. Findable Book Support (LMhS): Shall be 16-gauge steel, one (1) piece construction, 6" or 9" high, with a 6 1/4" long "T" shaped base. The top and side faces shall be flanged and have a 1/4" radius. Sides shall be taper-flanged 7/8" at base to 5/16" at top for added strength.
- O. Options:
  - 1. Universal Display Shelf (LSwdddUDA): Shall be dual purpose. Shelf when used in flat position provides 8" storage with a 5 1/2" integral back. In 55-degree sloped position, shelf shall be bolted to side bracket and shall provide 5 1/2" storage with 8" integral back. All universal shelves must be interchangeable with conventional shelves. Shall be formed with front and rear faces formed 3/4" high and box formed with no less than four (4) 90 degree bends (i.e. down 3/4", return 9/16", return 3/8" and return 5/16"). They shall present a smooth, closed appearance on both faces inside as well as outside with all sharp edges

eliminated, yet be arranged to receive book support and label holder.

2. Adjustable Divider Shelf (FswdddA): Shall be formed of not less than 18-gauge steel, with front face formed  $\frac{3}{4}$ " high and box formed with no less than four (4) 90 degree bends (i.e. down  $\frac{3}{4}$ ", return  $\frac{9}{16}$ ", return  $\frac{3}{8}$ ", and return  $\frac{5}{16}$ "). The rear of the shelf shall be formed with a vertical flange 4  $\frac{9}{16}$ " high, a  $\frac{5}{16}$ " return to the rear, a  $\frac{1}{4}$ " return down. They present a smooth, closed appearance on both faces, inside as well as outside, with all sharp edges eliminated. The shelf surface and rear vertical flange shall be punched on 1" horizontal centers for three-point reception of adjustable divider lugs. The shelf shall carry a load of 50 pounds per square foot without deflection in excess of  $\frac{3}{16}$ ". Letter-size shelves shall be 10  $\frac{3}{4}$ " actual depth and legal size shelves shall be 13  $\frac{3}{4}$ " actual depth.
3. Divider Base Shelf (FwdddBSA): Shall be formed of no less than 18-gauge steel. The front face shall be the same as the adjustable divider type shelf. The shelf surface, slots, rear vertical flange and all other features of the base shelf shall be the same as the specification for adjustable shelf. Side flanges of the base shelf shall engage formed lugs in the base shelf bracket neatly and securely to render full-support to the side surfaces. In addition a kick strip shall be provided as specified under closed base shelf.
4. Shelf Divider (Fhdd): Shall be formed of 20-gauge (until 14" deep) or 18-gauge steel (15" deep and more) with one (1) lug at the top rear side and two (2) lugs on the bottom to engage slots in the shelf for easy adjustment on 1" horizontal centers. The front top corner of the divider shall be neatly rounded with an approximate 2" radius. Exposed edges of the divider shall be smooth and free from burrs.
5. Integral Backstop Shelf (FSwdddNSA).
6. Sliding Reference Shelf (LwdddSRA): Shall be 11" deep and be made of minimum 20 gauge steel reinforced on each side with steel angles for securing to slides. All neatly welded and grinded to remove all sharp edges and corners. The shelf shall operate on double extension ball-bearing slides equipped with rubber bumpers on each end of travel. The assembly shall be securely attached to a standard adjustable shelf with 14 gauge "Z" brackets and at least two (2) screws at each end. This shelf is easy to change from one (1) position to the other without the use of hardware or tools
7. Hinged Periodical Display Shelf (LSwdddPHA): With 12" nominal depth storage shelf; shall be 14" actual depth, formed of not less than 18 gauge steel. The front face shall be formed 1" high with the top edge having a  $\frac{3}{8}$ " hem bend on the outside surface to give added strength and to provide a smooth clean seam. The sides are formed up 1". The back flange is  $\frac{1}{2}$ " and formed downward to provide a smooth flush surface for display material. A 16 gauge pivot is provided on the underside of the shelf at each side, located so that the display shelf will rest unaided in a horizontal position. The pivot is secured to the storage shelf bracket with a  $\frac{1}{4}$ " - 20 shoulder bolt and lock nut. The 18 gauge storage shelf and the 16 gauge storage shelf brackets are 12" nominal depth (11" actual) and are constructed similar to the standard 18 gauge adjustable shelf and 16 gauge adjustable shelf bracket except that the shelf brackets are punched to receive the shoulder bolts for attaching the pivots. Specification for 16" nominal depth (15" actual) hinged periodical display adjustable shelf similar to above.
8. Hinged Periodical Display Base Shelf (LwdddPHBA): With 12" nominal closed base storage shelves. The hinged shelf shall be of the same construction as the hinged periodical display adjustable shelf except that the 12" nominal (11" actual) storage portion will be constructed similar to the standard 18 gauge closed base shelf and 16 gauge closed base shelf bracket except that the shelf bracket shall be punched to receive the shoulder bolts for attaching the pivots.
9. Divider Type Hinged Periodical Display Shelf (LSwdddPHA-DVdd).
10. Divider for Hinged Periodical Display Shelf (FHhdd): Shall be formed of 18 gauge steel with one (1) lug at the top rear side and two (2) lugs on the bottom to engage slots in the

shelf for easy adjustment on 1" horizontal centers. The front top corner of the divider shall be sloped at 45 degrees to prevent any obstruction with the hinged periodical shelf. Exposed edges of the divider are smooth and free from burrs.

11. Hinged Periodical Display Shelf with Plexiglas Cover (LSwddPHA-dd-P).
12. Picture Book Shelf (LSwddBRAA): Shelf shall be made of a 18-gauge steel, with a 3-inch high front lip (20-gauge) welded to the 3/4" box formed edge of the shelf, a self-hanging removable 10-inch high inclined back (20 gauge) and two 16-gauge shelf supports, 7-3/8" high, designed to provide a 5-degree slope to the shelf.
13. Media Shelf Single Tier (FSwddMSA).
14. Sloped Base Shelf (FwddSNSBSA): Shall be formed of not less than 18-gauge steel. The front face is formed 3/4" high with no less than four (4) 90-degree bends. The rear of the shelf shall be formed with a vertical flange 5" high, 5/16" return to the rear, and a 1/4" return down. Side flanges of the base shelf engages formed lugs in the base shelf support brackets neatly and securely to render full-support to the side surfaces of the shelf. In addition a kick strip shall be provided as specified under closed base shelf. This shelf is sloped by the insertion of two (2) lateral plate supports 20-gauge at the end bracket hook support. These lateral plates provide 5 degree slope to base shelf.
15. Adjustable Divider Sloped Shelf (FSwddSA): Shall be formed of not less than 18 gauge steel, with front face formed 3/4" high and box formed with no less than four (4) 90-degree bends (i.e. down 3/4", return 9/16", return 3/8", and return 5/16"). The rear of the shelf shall be formed with a vertical flange 5" high, a 1/4" return to the rear, a 1/4" return down, and 1/4" side flanges returned to the rear. They present a smooth, closed appearance on both faces, inside as well as outside, with all sharp edges eliminated. The shelf surface and rear vertical flange shall be punched on 1" horizontal centers for three-point reception of adjustable divider lugs. The shelf carries a load of 50 pounds per square foot without deflection in excess of 3/16". Letter size shelf is 10 3/4" actual depth and legal size shelf is 13 3/4" actual depth. This shelf is sloped 5 degrees by the insertion of two (2) 20 gauge lateral plate supports at the end bracket hook support.
16. Fixed Media Browsing Box Shelf (FwddFDA): Browser box for CD's, videocassettes, paperback books, audio tapes and various computer tape cartridges. Units shall be cantilever type, freestanding steel multimedia shelving. Each browser configuration shall be offered in a fixed style and a pull-out version. The single tier browser boxes shall be 33 13/16" wide x 10" deep x 5" high. A rubber mat longitudinally corrugated is installed on the shelf and will act as a non-skid surface. All browser box formations in both fixed and pull-out versions shall be formed of 18 gauge steel, with ends bolted to the formed box. Ends are 16 gauge steel on all boxes, and on fixed browser boxes are formed as brackets for attaching to shelving frames. The box formations have a 2 1/2" high front face. All browser boxes shall have a sloping back support angled back at approximately 15 degrees from vertical. A 3/4" x 13/16" U-shaped cross-member shall be mechanically attached between ends and in line with front boxing on browser unit. A series of 1/4" diameter holes shall be aligned along the inside facing horizontal center line of this tube, and matching holes shall be inserted at the same elevation along the sloped back support. Front to back compartment dividers shall be installed by inserting 1/4" diameter steel rods into the hole placements, and are to be adjustable with ease. The fixed browser box versions shall be 35 5/16" wide.
17. Pull-out Media Browsing Box Shelf (FwddSDA): The pull out browser box versions shall be 33 13/16" wide, and shall have a saddle type support structure of 18 gauge steel. The saddle shall produce a fixed, fully closed bottom to the assembly, and the continuous formed ends shall be formed as brackets for attaching to shelving frames. The pull-out box portion shall operate on full-extension ball bearing slide mechanisms 10", mounted to box and the saddle end brackets at each end. The design of all browser box versions shall produce a clean finished appearance. No sharp edges or exposed assembly hardware shall be acceptable.

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18. Base Shelf with Integral Back (FwwddLBBSA): Shall be formed of not less than 18 gauge steel. The front face shall be formed  $\frac{3}{4}$ " high with no less than four (4) 90 degree bends (i.e. down  $\frac{3}{4}$ ", return  $\frac{5}{8}$ ", return  $\frac{3}{8}$ " and return  $\frac{5}{16}$ "). The rear of the shelf shall be formed with a vertical flange  $1\frac{1}{2}$ " high,  $\frac{5}{16}$ " return to the rear, and an  $\frac{11}{16}$ " return down. The integral back is designed to receive a sliding wire book support. Side flanges of the base shelf shall engage formed lugs in the base shelf bracket neatly and securely to render full-support to the side surface of the shelf. In addition a kick strip shall be provided as specified under closed base shelf.
19. Wall Angle (LWAA): Shall be of at least 11-gauge and measuring at least 3" x 2" x 1" wide and shall be provided for all single faced sections in the quantity of one (1) per section
20. Floor Anchor Angle (19.200.026.01).
21. Range Finder Double Face Aluminum (L2RFA): Shall be formed "V" shaped of one (1) piece construction of either .025 aluminum or 22-gauge steel. The four (4) horizontal edges shall be designed to accept a 3" x 5" card on both vertical exposed faces.
22. Card Holder (L2CHA): Shall be polished aluminum designed to accept 3" x 5" card.
23. Label Holder Snap-on (LwLHP): Shall be 24 gauge aluminum (anodized finish) 5" wide with a  $\frac{3}{4}$ " high front flange. It shall be designed to fit snugly to the front return of the adjustable shelves with no encroachment on storage surface. Also available in clear acrylic plastic.
24. Paperback Zig Zag Backstop (LwwPDA): This display unit is made of 18 gauge steel and has a zig zag shape. It shall be 5" high and is placed vertically on an existing shelf. Bends have an alternate width of 4.5" and 5.25". It shall be available in 3 formats: 5 peaks for 36" wide shelf, 4 peaks for 30" wide shelf and 3 peaks for 24" wide shelf. Returns of 0.625" at the bottom helps for equilibrium and allow to fix the display with double face tape.

### 2.3. FINISH SPECIFICATIONS

- A. Shall be the finest of their respective kinds and those best adapted to the construction for which they are employed to meet ISO 9001:2008 quality standards. All steel shall be superior quality mild, cold rolled, pickled, and double annealed, free from scale and buckle. All plating used on exposed parts shall be metallic furniture stock. All gauges are U.S. standard. The design of all parts shall be such that the completed installation shall present a neat and finished appearance and shall be free from exposed sharp edges or projections. All other special materials shall be as hereinafter specified.
- B. All components shall be painted with an electrostatically applied powder coat finish. All steel parts shall be machined smooth and thoroughly cleaned by a process of completely washing in a phosphatizing solution to insure removal of oil, grease or other foreign material which in any way would interfere with the adhesion of the priming coat. Following the cleaning process, all parts shall be coated and confirming every part is thoroughly and completely covered with fine powder coat, and baked to the paint manufacturer's recommendation. The finish for powder coat shall be medium gloss, giving a reading of 50 to 60 degrees on a standard gloss meter and must be capable of withstanding severe hammer and bending test without flaking. The finish for epoxy-polyester hybrid powder coat shall be a minimum 1.2 mil thickness capable of resisting acetic acid, household ammonia, 10 % lye, alcohol, salt spray, abrasion and printing, and all normal usage resistant requirements of a good finish. In addition, powder coat shall not be off gassing to prevent deterioration of collection and other stored materials. Colors to be selected by owner.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

- A. Examine subfloor surfaces, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fixed storage units.

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1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of fixed storage units.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2. INSTALLATION

- A. Install components and accessories after finishing operations, including painting, have been completed. Install shelving units to comply with final layout drawings, in strict compliance with manufacturer's printed instructions and structural calculations. Position unit's level and plumb at proper location relative to adjoining units and related work
- B. Field Quality Control: Remove and replace components that are chipped, scratched, or otherwise damaged and which do not match adjoining work. Provide new matching units, installed as specified and in manner to eliminate evidence of replacement.
- C. Adjust: Adjust components and accessories to provide smoothly operating, visually acceptable installation.
- D. Cleaning: Immediately upon completion of installation, clear components and surfaces. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.
- E. Protection: Protect system against damage during remainder of construction period. Advise Owner of additional protection required to ensure shelving units will be without damage or deterioration at time of substantial completion.

### 3.3. DEMONSTRATION/CUSTOMER TRAINING

- A. Provide complete training to end-user's staff. Training shall include general safety and operation instructions, and basic preventative maintenance procedures.

**END OF SECTION**