

WARNING

In order to make the proper use of the Metal Storage Shelving (Four-Post Shelving) technical specifications, please edit the document at the following points prior to print or email the document :

2.1.D. to Select the accessories applicable to the project.
2.1.P.

SECTION 10 56 13 (10675)

METAL STORAGE SHELVING

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.

1.3. PERFORMANCE REQUIREMENTS

- A. Seismic Performance : Provide fixed shelving capable of withstanding the effects of earthquake motions determined according to the building codes.
- B. Design Requirements : All shelving elevations as [per attached drawings] or [described in the specifications].
- C. Color Card : All available color selections. Vendors must provide a minimum of 12 color selections [powder coat paint finish].
- D. Installer Certificates : Signed by manufacturer certifying that installers comply with specified requirements.
- E. Product Certification : Submit manufacturer's certification that products comply with requirements of the specifications. A list of deviations must be provided for all items not meeting the specifications. The document must include appropriate justification of the alternate proposed design.
- F. Warranty : Submit a written warranty, executed by Contractor, Installer and Manufacturer, agreeing 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.

The entire shelving installation will be warranted against defects in materials for five (5) years and workmanship for a period of one (1) year from date of acceptance by the Owner.

- G. Reference list : Provide a list of three (3) fixed storage installations to be called or visited by Owner, Architect and Construction Manager. Installation must be of similar size, scope of specified system. Visit is intended to witness operation and quality of installation. Manufacturer is required to address all issues raised by Owner, Architect and Construction Manager. List must include contact names, phone numbers, size and quality of carriages and system operation.
- H. Mandatory : Manufacturers must be ISO 9001:2008 certified. Submit ISO certification with proposal.

1.4. QUALITY ASSURANCE (Submittals due to all bidding contractors at time of bid, failure to do so will be cause for disqualification.)

- A. Manufacturer's Certifications : Separate written Certifications 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.

1.5. 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. Preinstallation 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.
 - d. Manufacturer's representative.

PART 2 PRODUCTS

2.1 MATERIALS – FOUR-POST SHELVING

- A. Upright frames : Upright frames are made of two or more cross members mechanically assembled without screws or rivets to join the top and bottom (and center if necessary) of the post and form a rectangular upright frame. The post is made of 16-gauge 1 ¼" x 1 ½" rectangular shaped cold rolled steel. The post is slotted on each side at every one inch increment. The slots are 3/16" wide x 5/8" long and are designed to accommodate a variety of shelf and roll-out drawer configurations. The back of the post is also slotted at every 1 ½" increments. Back post has also two rows of slots at the back, side by side from top to bottom. They are 3/16" wide x 5/8" long with 3/8" between the two rows. The uprights must allow for component integration on either 1" or 1 ½" increments depending only on the selected shelf component.
- B. Cross members : Cross members are 4" high x ½" wide. They are made of 16-gauge steel folded to create a "U" shape channel. At both ends, hook type design allows to snap the cross members in both rows of slots at the same time. In seismic zones, the cross members are welded to the post.
- C. Levelers (optional) : Each post shall have an integrated leveler 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 ½" thick and affixed to the post to form an integral finished product.
- F. Supported type :
 - 1. Full-depth shelves : Full-depth shelves are made of box rolled formed 22-gauge steel, with "Four Bend" ¾" edge construction which adds additional strength and capacity as well as it creates a hidden safety edge to protect people and items. The full-depth shelves are supported by two longitudinal shelf supports and the appropriate number reinforcement channels. Shelves are also available in 18-gauge steel as an option.
 - 2. Longitudinal supports : [¾" high supports] or [1 ¼" high supports for heavy duty application] are made of one "U" shaped 12-gauge steel channel. A standard formed steel claw is welded at each end to form a complete support. These supports are inserted into the slots located at the back of the post.
 - 3. Front-to-back reinforcement channels : [¾" high reinforcement channels] or [1 ¼" high reinforcement channels for heavy duty application] are made of 12-gauge steel formed in a "U" shaped channel and are sitting on the longitudinal shelf supports.
 - 4. Base support : A 12-gauge steel special "U" shaped channel is provided for the bottom shelf. The support is inserted at the bottom of each post and anchored to the floor or to the carriage, in compliance with seismic standards.

- G. Hooked type :
1. All shelves and canopy tops shall be constructed of minimum 18-gauge steel with "Four Bend" $\frac{3}{4}$ " edge construction and clipped on the uprights. Welded reinforcement can be added to accept heavier loads. Shelves floating on support are unacceptable (1" thick shelf with 3 bends also available).
 2. All shelving shall be back-to-back shelves and shall have capability of being adjusted without use of tools. Canopy tops required on all sections.
 3. All shelves shall 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 (required with back-to-back hooked type) : 1 $\frac{1}{8}$ " 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 dowell pins. Sway braces are positioned where needed on taller shelving sections to add lateral stability.
- I. End panels : Shall be constructed of 18-gauge steel, 1 $\frac{3}{8}$ " thick, they are bolted to bottom and top upright cross members.
- J. Side closure panels : 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.
- K. Plain back stops (single entry) : Shall be 5 $\frac{17}{32}$ " high formed of 20-gauge steel with a $\frac{3}{8}$ " bend on top and bottom and a 1 $\frac{3}{16}$ " bend on each side.
- L. Slotted back stops (single entry) : Shall be 5 $\frac{17}{32}$ " high formed of 20-gauge steel with a $\frac{3}{8}$ " bend on top and bottom and a 1 $\frac{3}{16}$ " bend on each side. Slots are located on 1" increments for divider adjustment.
- M. Plain center stops (double entry) : Shall be 4 $\frac{3}{16}$ " high formed of 20-gauge steel with offsets bends to center on upright frame.
- N. Slotted center stops (double entry) : Shall be 4 $\frac{3}{16}$ " high formed of 20-gauge steel with two offset bends. Slots are located on 1" increments for divider adjustment.
- O. File dividers : Shall be formed of 20-gauge steel with one lug at the top rear and two lugs on the bottom to engage slots in the shelf for easy adjustment on 1" horizontal centers. The front top corner of the divider is rounded with an approximate 2" radius.
- P. Sliding reference shelf : Shall be 11" deep by 30" wide, made of 20-gauge steel reinforced on each side with steel angles to secure slides. Shall operate on double extension ball bearing slides equipped with rubber bumpers on each end of travel. The assembly is securely attached to underneath the storage shelf, flush with the front edge.
- Q. Modular drawers : All drawers shall be easily relocated at 1" increments without using any tools. They are made of 18-gauge steel with 3 bends at the front and side top-lips. Each top-lip shall have perforations on the inside upper edge at every 1" increments

to receive partitions. A front cover made of 18-gauge steel shall be bolted to each drawer and shall incorporate a 5" wide x 1 1/4" high flush mounted handle. The clear inside space have to be as a minimum overall : nominal dimensions less 1/8" in height, 2" in depth and 4" in width. The load capacity shall be 180 pounds per drawer. Drawers shall be available on 1" height increments from 4" to 12" high. The sliding ball bearing support shall provide a smooth pull-out extension up to a maximum of 28" of stroke for deeper drawers. The sliding ball bearing glide shall be mounted on a hook-support made of 16-gauge steel. An interlock system can be incorporated to a group of drawers and will prevent to open more than one drawer at a time. A locking device can be added to a group or individual drawers.

- R. Modular trays : All trays shall be easily relocated at 1" increments without using any tools. They are made of 18-gauge steel with 3 bends at the front and the side top-lips. Each side top-lip is designed to receive a nylon strip and provide a smooth pull-out and push-in movement. This 3-bend lip shall be 15/16" wide with two additional 9/16" bends to act as a reinforcement channel and support the tray pan. The front and back of the tray will incorporate a 5" wide x 1" high opening with a round edge which will act as pull handles. The front and the back of the top-lips will be formed of two 3/8" bends to provide adequate rigidity and a smooth finish. The clear inside space shall be as a minimum overall : nominal dimensions less 1/4" in height, 3/4" in depth and 4" in width. The load capacity shall be 75 pounds per tray. Trays shall be available on 1" height increments from 2" to 8" high. A pair of guide supports will provide the adjustability for the trays. Each support shall consist of a "U" channel welded to a 16-gauge steel plate and shall be designed to prevent the tray from tipping when pulled out.

2.2 FINISH SPECIFICATION

- A. Shall be the finest of their respective kinds and those best adapted to the construction for which they are employed to meet ISO 9001:2000 Quality standards. All steel shall be the best 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 :
[B-a) Powder coat finish]

All steel parts shall be made 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 by spraying, making certain 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 great value books. 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.
 - 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 EXAMINATION

- A. 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.
- B. Adjust : Adjust components and accessories to provide smoothly operating, visually acceptable installation.
- C. 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.

END OF SECTION