**PART 1 - GENERAL**

**1.01 SUMMARY**

A. Provisions of Division 01 apply to this section.

B. Section Includes:

1. Cantilever-bracket type metal library shelving system for storing books and other library media.

**1.02 SYSTEM DESCRIPTION**

A. Single-faced and double-faced shelving units with adjustable shelves cantilevered on brackets from a central column, part of an integral frame unit. All components are modular and interchangeable to permit reconfiguration with no additional items. Shelving shall be complete with all appurtenant features, and of heights and other dimensions as indicated. All units are 90 inches high unless otherwise indicated. All elements must be installed to meet seismic requirements of the California Building Code.

**1.03 SUBMITTALS**

A. Shop Drawings:

1. Submit floor plans, elevations, and details indicating shelving layout and access.

2. Drawings shall show elevations of all shelving units with dimensions relative to number of shelf openings, clearances between shelves, clearance between uprights and usable shelf depth.

B. Product Data: Manufacturer's data, catalog information, fabrication details and specifications, and any special construction required.

C. Material Samples:

1. Samples of manufacturer's complete color charts for all exposed materials for initial selection.

2. Samples for final verification of actual materials with colors and finishes selected.

D. Seismic Calculations: Provide seismic calculations for the entire bookstack system, including columns, bases, all connections and anchorages. The system shall be capable of resisting a lateral seismic force in any direction, acting simultaneously with a vertical seismic force as determined by CBC. The bookstack system shall be considered as “cabinets”. All allowable stresses and other design criteria shall be permitted. Weight is defined as the total weight of the shelving system plus the weight of the materials stored. Stresses and deflections shall be investigated for shelves fully loaded in combination with seismic forces, and loaded one side only in combination with seismic forces.

**1.04 QUALITY ASSURANCE**

A. Manufacturer’s Qualifications: Shelving shall be manufactured by firms having not less than five years experience in providing products and installations of comparable scope, quality and complexity, and the capability of documenting such experience. Firm must have a designated product representative within the Southern California area.

B. Installer’s Qualifications: Shelving shall be installed by firms experienced in projects of comparable scope within the last five years and able to document the experience of three such projects with project locations and contact data for the owners.

C. Shelving shall meet “The American National Standard for Single-Tier Steel Bracket Library Shelving”. Test data published in Library Technology reports, Volume 58 No. 4, 2022.

**1.05 DELIVERY, STORAGE AND HANDLING**

A. Deliver products only after exterior openings are closed up; wet Work is complete, and proper facilities are available for handling, storing, and protecting items.

B. Deliver components in sealed containers, with manufacturer's labels intact.

C. Deliver materials carefully and store on clean surfaces or raised platforms in a safe, dry area fully protected from weather. Keep all materials clean and dry.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

A. As a standard of quality, “Aetnastak” library shelving products, by Montel, Inc.,

B. Borroughs Corp.,

C. Estey by Tennsco.

D. MJ Industries.

E. Spacesaver.

F. Or equal.

**2.02 GENERAL**

A. Shelving, either single-shelf or double-shelf, shall provide frames that support shelves cantilevered from center columns (or uprights). Frames shall be modular of unitary construction consisting of welded frame assemblies, one for each section of shelving. Starter and adder combinations or welded frames every other section are not acceptable, nor are diagonal sway braces. Modular construction shall allow all components of the section to be divided for rearrangement or recombination into single- or double-shelf units without procuring additional components.

B. Sections shall be fabricated in 36” widths except where 30” and 24” widths are required to accommodate dimensional layouts or field conditions.

C. Steel used in the construction shall be the best mild, cold-rolled, pickled, double annealed, free from scale or buckle, and shall conform to the applicable reference standards of the AISC Manual of Steel Construction, AISI Cold Formed Steel Design Manual, and ASTM Specification A283-4Aaa. Components shall be fabricated of U.S. Standard gage steel sheet of gages specified.

D. Fabrication:

1. Preparation:

a. Coordinate with other Work supporting or adjoining shelving system and verify requirements for cutting out, fitting, and attaching.

b. Verify sizes, designs, and locations of items; do so at Project site whenever construction progress permits. Provide 24" or 30" wide shelving units as required to fit wall areas.

2. Construction:

a. Form components accurately, uniform and true to profile without irregular, sharp or jagged edges.

b. Ensure metal thickness and assembly details provide ample strength and stiffness.

c. Ensure shearing and punching leaves true lines and surfaces.

d. Grind all welds to provide smooth, seamless appearance.

**2.03 METAL SHELVING COMPONENTS**

A. Unit Frame

1. Columns (or Uprights): Shall be formed of minimum 16-gauge steel into a tube shape with no less than 2" stiffening flanges, the tube to measure 2" in the web and 1-5/16" at the front and rear faces. Columns shall present a smooth, closed box shape 2" x 2”- 5/8" in cross section. When bolted to the adjoining column of the next unit, each joined upright shall have no less than eight right-angle bends. Each column shall be perforated full height on both faces with a row of slots spaced 1" on vertical centers to receive hooks and lugs of shelf brackets, thus permitting 1" adjustment of shelves. In adjoining columns, the rows of slots shall be approximately 5/8" on lateral centers. Columns shall be marked every three inches to facilitate visual positioning and adjustment of shelves. Inter-membering holes for bolting columns into a range shall be provided.

2. Two uprights are required for each section of a range, since no adjacent sections may share a common upright and be truly modular. Provide gussets at uprights as well as all other items needed to meet seismic design requirements.

3. Units’ heights shall be 90,” 66” or 42” as indicated on the Drawings or specified herein.

4 Spreader Tube: The top spreader shall be a fully closed tube of 16-gauge minimum, 2" x 2" square, clean and smooth, securely welded to the upright columns. Provide holes as required for conduit.

5. Provide intermediate spreaders of the same construction as necessary to meet seismic requirements.

6. Bottom Spreader Channel: Shall be channel shaped, open to the floor, of minimum 16 gauge steel. This spreader shall be electric welded with continuous welds to the upright columns at a height to assure continuous through shelving on the base shelves. Slots in bottom spreader channel are provided to permit leveling function at the column without having to remove the base shelf. Provide holes as required for conduit.

7. Assembly: The above horizontal spreaders shall be electrically welded to the uprights with a full, continuous bead at each of the joints necessary to form a rectangular frame of one- piece construction without the use of nuts, bolts or any other type of fastener. The completed frame shall be rigid without the use of sway braces, gusset plates, angle braces, or any other device.

B. Leveling System: Provide an 11 gauge steel threaded clip securely welded to each of the frames at the uprights and below the bottom channel spreader to accommodate a 5/16”- leveling glide. Such glides allow for maximum leveling on irregular floor conditions. Base shelf brackets contain threaded weld-nuts to accommodate glides. Levelers shall be provided at every frame upright. Each double-faced end section in a range shall receive six levelers; each additional double-faced section four levelers. Each single-faced end section in a range shall receive four levelers; each additional single-faced section also receives four levelers.

C. Base Shelf Supports: Shall be made of not less than 16-gauge steel with front and top faces flanged on a 5/16" radius and the exposed corner smoothly rounded. They shall have three projections at the rear, two hooks at the top and right-angle tab at the bottom with a hole to accept a 5/16" bolt. With the bottom tab bolted to the column, the hook shall tightly engage its slot in the column. Adjoining base shelf supports shall be bolted together to preserve alignment; with bolts placed in indentations deep enough to prevent damage to books on the base shelf. Two right-hand and two left-hand base shelf brackets shall be used on double face units to provide flexibility for future rearrangement from double face to single face.

1. Base shelf supports shall be 12” deep (nominal).

D. Shelf Brackets: Shall be made of not less than 16 gauge steel with front, top and bottom faces flanged with an approximate 5/16" return. Brackets shall have three projections at the rear, two hooks and one safety lug, to engage the column slots and permit easy adjustment of shelves with maximum possible protection against dislodgement. Brackets shall be fastened to the shelves with tabs. An indentation is furnished to serve as an automatic bracket spacer, eliminating the pos­sibility of adjacent bracket overlap. The bracket design allows for shelf adjustment upward or downward (i.e. walking-the-shelf) without disturbing adjacent shelves.

1. Shelf brackets shall be 12” deep (nominal).

E. Adjustable Integral Back Shelves: Front face shall be formed 3/4" high and box formed with no less than four 90 degree bends (i.e. down 3/4", return 2", return 3/8" and return 1/4"). The rear of the shelf shall be formed up 1-3/8" high with a 5/16" return forming a rail that will receive a sliding book support. 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 supports and label holders. Adjustable bookshelves shall be designed to carry book loads of 50 lbs. per square foot without deflection in excess of 3/16".

1. Shelves shall be 12”D (nominal). Provide quantities as follows:

2. Each 90”H unit to receive six (6) adjustable shelves (single face) or (12) adjustable shelves (double face).

3. Each 66”H unit to receive four (4) adjustable shelves (single face) or (8) adjustable shelves (double face).

4. Each 42”H unit to receive two (2) adjustable shelves (single face) or (4) adjustable shelves (double face).

5. Each 30”H unit to receive one (1) adjustable shelf (single face) or two (2) adjustable shelves (double face).

F. Closed Integral Back Base Shelves: Front face shall be formed 3/4" high and box formed with no less than four 90 degree bends. The rear of the shelf shall be formed up 1-3/8" high with a 5/16" return forming a rail that will receive a sliding book support. The surface of the bottom shelf shall be flush with the top surface of the bottom spreader. Side flanges of the base shelf shall engage formed lugs in the base shelf support neatly and securely to render full support to the side surfaces of the shelf. Base shelves shall be designed to carry book loads of 50 lbs. per square foot without deflection in excess of 3/16".

1. Two base shelves shall be provided for double-face units to provide flexibility for future rearrangement from double-face to single-face.

2. In addition, an adjustable kick strip 3" high shall be provided, having return flanges at the top and bottom for stiffening. A slotted flange at each end shall engage with a slot in the base shelf support to allow for adjustability and presentation of a neat closed appearance with the surface of the floor. Each single-face unit shall receive one base shelf and each double face unit two base shelves.

3. Shelves shall be 12” deep (nominal). The maximum overall depth for all bookstacks provided shall be as follows:

#### SHELF AND BASE DEPTHS NOMINAL OVERALL DIMENSION

12" S.F. 13-3/16"D

24" D.F. 24-3/8" D

G. Sliding Wire Book Support: Clip shall be formed of A.B.S. white plastic 1-11/16"L x 1-1/4"H with a molded rectangular clip which engages into the rear of the adjustable integral back shelf. Wire shall be .235" in diameter zinc plated and extend 7" over the shelf to support books. Provide 1 per integral back shelf.

H. Canopy Top Supports: Shall be 11-gauge bracket designed to support continuous wood or laminate tops. Canopy top supports shall be supplied as single face components. Provide angles for attachment to tops. Provide on all 42” high units.

I. Wall Angles: Shall be minimum #12 gauge and measuring at least 3" x 2" x 1" wide. Provide for all single-faced sections as required to meet structural design criteria.

J. Card Holders: Provide two aluminum cardholders for each end panel of double-faced shelving ranges, capable of holding a 3-inch by 5-inch card.

**2.04 CANOPY TOPS AND END PANELS**

A. High-Pressure Laminate Canopy Tops: Shall be 1-1/4" thick, 3-ply particleboard construction with .050" high-pressure laminate on both faces and all edges. Tops shall be assembled in continuous lengths to completely cover the tops of bookstack units, including corners. Where joints are required, they shall be splined and bolted to produce a flush connection. Tops shall be braced with 11-gauge brackets designed to permit tops to support books and displays. Laminate color and pattern shall be selected by Architect.

1. Provide on all units 42” high or shorter.

B. High-Pressure Laminate End Panels: End panels shall be constructed of 1-3/16" three-ply particle board core with .050 inch high pressure laminate on both faces and all edges. Panels shall be full width and height of ranges to completely cover exposed ends of bookstack units. They shall be bolted to the last upright in the range. Laminate color and pattern shall be selected by Architect.

1. Provide at all exposed range ends, single-face or double-face.

**2.05 FINISHES**

A. Epoxy coating: Provide the manufacturer’s standard epoxy finish to all exposed steel surfaces. Prepare components for painting by a multi-stage smoothing, cleaning, and phosphatizing process to assure a smooth, clean surface with no trace of foreign material that would interfere with the adhesion of the epoxy powder. Finish shall be medium gloss, 1.2-mil minimum dry-film thickness, smooth, free of streaks, drops, sags, pinholes, checks, cracks, peeling, blisters, and foreign material, and capable of withstanding severe hammer and bending tests without flaking.

B. Color: Shall be selected by the Architect from the manufacturer’s standard range of colors.

# **PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Examine the areas to receive shelving to verify that setting conditions, dimensions, and other conditions meet the requirements for a satisfactory installation.

B. Do not proceed with installation until all unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

A. Install shelving in accordance with the manufacturer’s written instructions and approved Shop Drawings.

B. Install Work plumb, level, in true alignment and neatly trimmed out.

C. Provide spacer washers wherever needed at finished surfaces before tightening fasteners.

D. Ensure that all anchors are installed in accordance with the anchor manufacturer’s instructions, receive full embedment, and develop their full design strength.

E. If installation requires performing Work of fabrication, provide quality equal to that achieved in shop and conform to same standards.

F. Upon completion, touch-up any minor scratches or damaged finish with paint, matching color, and texture of finish.

**3.03 CLEAN UP AND PROTECTION**

A. Remove rubbish, debris, and waste material and legally dispose of off the Project site.

B. Leave area clean and ready for use upon completion.

C. Protect the Work of this section until Substantial Completion.

**END OF SECTION**