

**SECTION 105626 MOBILE STORAGE SHELVING**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the mobile storage shelving as shown on the drawings with the same aisle configurations and/or specified herein, including, but not limited to, the following:
  - 1. Mechanically assisted, carriage mounted high-density mobile storage units, support rails, fabrication, and installation including leveling of support rails.

1.3 QUALITY ASSURANCE

- A. The mobile storage shelving system shall be furnished and installed only by those firms engaging in the manufacture and installation of this type of equipment for the last three (3) years.

1.4 SUBMITTALS

- A. Product Data: Submit copies of manufacturer's latest published literature and test reports for materials specified herein for approval and obtain approval before materials are delivered to the site.
- B. Shop Drawings: Submit shop drawings for work specified herein for approval and obtain approval prior to fabrication and shipment of materials to the job site.
  - 1. Shop drawing shall show locations of work in the Project, elevations and profiles. Indicate materials, sizes, shapes, thickness, sizes and locations of structural sub- frames and reinforcing, location and installation requirements for fasteners, anchors, joints, and connection to other work. Include all required information to coordinate with the work of other trades, expressly concrete work.
  - 2. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, and track weld are not acceptable.
- C. Samples: Two (2) sets of samples of materials specified herein shall be submitted for approval. Approval must be obtained before materials are delivered to the site.
- D. Maintenance data to include operating and maintenance manual.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials specified herein in manufacturer's unopened containers, with manufacturer's name and point of origin on each container.
- B. Handle and store in accordance with manufacturer's instructions and recommendations.

**1.6 JOB CONDITIONS**

- A. Do not install work of this Section until space has been enclosed and is weathertight, and until wet work in the space has been completed and is nominally dry, and until work above finish ceilings has been completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

**1.7 WARRANTY**

- A. Warrant all work of this Section for a period of one (1) year against defects in materials, operation and workmanship. Warranty period to begin after Owner acceptance.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis-of-Design: Provide mechanically-assisted, carriage mounted high-density mobile storage units by Spacesaver Corporation or equivalent product by ASRS of America, Datum Filing Systems, Inc., Kardex Systems, Inc. or approved equal.

**2.2 MECHANICALLY ASSISTED SYSTEMS**

- A. Mobile mechanically assisted shelving system components:
  - 1. Rails shall be of hardened steel or a composite of steel or aluminum with a hardened steel bearing surface. Rails shall be set completely level with a direct connection to the slab by leveling bolts or steel shim stock within recess to height of adjacent floor. After leveling rails pour concrete entire area of recess with concrete conforming to the requirements of Section 033000.
    - a. Capacity: 1,000 pounds per lineal foot of carriage.
  - 2. Wheels shall be of precision ground hardened steel, shaped as required for positive ride on rail, not less than 4-1/2" in diameter. Wheels shall ride on sealed bearings as required. Provide two (2) anti-tip mechanisms per track assembly at leading edge of carriage with adjustable guide rollers for carriage alignment.
    - a. Capacity: Minimum load capacity per wheel: 3200 lbs.
  - 3. Carriages shall be of steel or aluminum construction, factory assembled and aligned, with welded or mechanically fastened connections in maximum lengths practical for transport and installation. Carriages shall be able to support a minimum load of 1000 lbs./foot without distortion. Carriage sections shall be field connected to each other to achieve the required overall length, plumb and level without distortion.
  - 4. Finish of carriages shall be powder coat finish with no out-gassing; color selected by the Architect. Submit physical color sample sets for approval.
  - 5. Provide a hand cranked chain sprocket drive system. This system shall be provided with reduction gearing enabling the user to move multiple ranges at one time, both fully loaded and unbalanced loaded. All bearings shall be permanently sealed and lubricated. The drive chain shall be linked to the drive wheels via solid steel drive shafts rigidly connected to the wheels. Movement shall be uniform along the total length of the carriages, free of jerking, sway and whipping. There shall be no looseness or play in the drive, and moving ranges shall stop without drifting. The drive system shall be readily capable of being upgraded to electric operation. Provide crank at one end of carriage.

Provide an alternate for cranks at both ends if an interlinked lock/reset safety system is available.

- a. Drive system gearing shall be designed to permit 1 lb. of force applied to the drive handle to move a minimum of 4,000 lbs. of load.
6. Provide a safety system that locks the ranges adjacent to the open aisle. This system shall be set manually by the user before entering the open aisle; alternately it can set itself automatically as part of the action of opening an aisle. Unlocking the ranges for movement shall be only via manual reset at the open aisle. Provide a lock and reset control to one end of carriage. Provide an alternate for lock/reset at two ends if an interlinked system connecting the two ends is available. Include "safety floor" system to prevent device from closing on person within unit when open.
7. Provide the manufacturer's standard wheel mounted anti-tip devices.
8. Provide adjustable limit devices that set the width of the gap between closed ranges individually. Minimum gap between ranges shall be one (1) inch, maximum center to center dimension for ranges shall be 23".

## 2.3 STORAGE SHELVING

- A. Cold rolled steel storage shelving shall be capable of supporting a live load of 50 lbs./lin. ft. with deflection limited to 1/240.
- B. Storage shelving, where used on mobile carriages:
  1. Provide 4 post shelving system as defined by the American Library Association. Provide sizes and configurations as indicated on drawings. Provide seven adjustable shelves per face, one base shelf per face, and manufacturer's recommended shelf reinforcements.
  2. Uprights and spreaders shall be of welded construction.
  3. Shelves shall be adjustable on 1-1/2" centers.
  4. End panels shall be of steel on acceptable substrate. Provide cardholders as required for a complete installation. Width as indicated on drawings.
  5. Finish of shelving and end panels made of steel shall be powder coat, with no off-gassing. Color(s): Custom color(s) as selected by the Architect. Provide two (2) sets of physical samples of each finish for approval.
- C. Storage shelving, where used as "stationary end unit" for mobile carriages:
  1. As per standards noted above, mounted on a fixed carriage. Rails to extend under fixed carriage. Provide sizes and configurations as indicated on drawings.
  2. Provide fully concealed overhead tie struts as required.

## 2.4 GENERAL MATERIAL STANDARDS

- A. Steel
  1. All steel elements shall be commercial quality cold rolled prime steel. Steel elements shall consist of sheets, bar, channel, strip, round and angle stock.
  2. Welding standards shall be not less than CSA W59.1 with respect to structural integrity.
  3. Construction: Steel elements shall be joined and connected by invisible welds and mechanical fittings to form frame components. Invisible welds shall be accomplished by a welding system of tungsten electrodes under an inert gas shield. Steel joints shall be

mitered and flush welded, full fillet ground, free from slag and spatter and shall have smooth finish. Welded steel stock joints shall appear to be one continuous piece of stock. All other visible pits, gouges and scratches in steel stock shall be filled and ground smooth before final finishing and assembly. Mechanical connections between steel components shall be accomplished by patented insert bolt fittings, pressure fit into preset openings in steel stock. Insert bolt fittings shall function as spacers between steel components. Grade 8 or better black Allen head fastener shall be used in insert bolt fitting.

4. Steel Finish: Steel components shall be polished and rendered residue free and covered with electrostatically-applied, thermo-hardened epoxy powder that is 60 microns thick. The method of treatment and finish shall be achieved in various steps by robotic automation. The first and second steps shall be treating the steel with a chemical bath, assuming that all dirt and oil shall be removed and applying an anti-rust agent to the surface. The steel shall be positively charged and shall travel through spray compartments that are pressurized slightly lower than the atmosphere. Spray guns shall control the homogeneous powder, which is given an electrostatic negative voltage charge 60 - 60 kilovolts. The negative and positive charge shall create an even attraction of epoxy to the steel surface, while the electrostatic force field shall provide a slightly thicker coating on all edges, leaving them slightly rounded. Coating shall provide a hard surface offering 4 to 5 times the durability over enamel paint. Color of finish coat black as approved by the Architect. Provide two (2) sets of physical color samples for approval.

- B. Aluminum: Structural aluminum conforming to 6063-T6 with clear anodized finish.

### PART 3 - EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where mobile storage shelving systems are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 PREPARATION

- A. Examine the Contract Drawings and Specifications in order to ensure the completeness of the work required under this Section. Supplementary parts, equipment, and work, necessary to complete fabrication and installation, though not specifically indicated on drawings or specified herein, shall be provided.
- B. Obtain approved shop drawings for all structural concrete work prior to production of shop drawings so as to ensure coordination with all construction in this are by others.
- C. Verify all measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades.

#### 3.3 INSTALLATION

- A. Installation shall be in strict accordance with manufacturer's installation instructions under direct supervision of the manufacturer's representative.
- B. Supports, anchorages and fastenings shall be secure and adequate for use intended.

- C. Install storage system plumb, level, rigid, securely anchored to building in proper location, in accordance with manufacturer's instructions. Install closures neatly.
- D. Set work accurately in location and alignment shown; in accordance with approved shop drawings.
- E. Form tight joints with exposed connections accurately fitted with uniform reveals and spaces. Where cutting, welding and grinding are required for proper fitting and jointing of the work, restore finishes to eliminate any evidence of such corrective work.
- F. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units.

### 3.4 DEMONSTRATION

- A. Start-Up Services: Provide factory-authorized service representative to provide start-up service and to demonstrate and train Owner's representatives.
  - 1. Test and adjust controls, limits and safeties. Replace damaged or malfunctioning controls and equipment.

### 3.5 ADJUSTMENTS, CLEANING AND PROTECTION

- A. Carefully check and adjust moving parts to ensure smooth, near silent, and accurate operation.
- B. Repair damaged work equal to new undamaged work, or replace with new, as acceptable to Architect.
- C. Clean, touch-up as required and remove and refinish damaged or soiled areas.

END OF SECTION 105626