

MOBILE STORAGE SHELVING SYSTEM (MECHANICALLY-ASSISTED BY SPACESAVER)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. Attachments: 1) Proposal Form reflecting base proposal and all required alternatives (Insert); 2) General and Supplemental Conditions (Insert).

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Mechanically assisted, carriage mounted high-density mobile storage units, support rails, fabrication, and installation. The drawing represents the capacity requirements. If the capacity cannot be achieved as noted on the drawing, vendor is responsible for bringing this to the attention of the owner as part of the proposal document.
 - 2. Aisle Widths: Minimum high-density shelving aisle width shall be no less than “ _____ ” between carriages.
- B. Related Work, Not Furnished:
 - 1. Structural floor system capable of supporting live and dead loads required by prevailing building codes, including rolling loads of storage units to be installed.
 - 2. Finish floor covering materials and installation [on raised floors and ramps or when on concrete with recessed rail installation.]
- C. Related Sections:
 - 1. [Section 03300 – Concrete Work]
 - 2. [Sections in Division 9 – Finishes, relating to finish floor and base materials.]
- D. Allowances:
- E. Alternates:

1.3 REFERENCES

- A. American National Standards Institute (ANSI) Standards:
 - 1. Applicable standards for fasteners used for assembly.
- B. American Society for Testing and Materials (ASTM) Standards:
 - 1. Applicable standards for steel materials used for fabrication.
- C. American Institute Of Steel Construction (AISC) Standards:
 - 1. Applicable standards for steel materials used for fabrication.

1.4 SYSTEM DESCRIPTION

- A. General: The system consists of [manufactured] [owner furnished] storage units mounted on manufacturer's track-guided carriages to form a compact storage system. System design permits access to any single aisle by manually moving units until the desired aisle is opened. The carriage/rail system provides uniform carriage movement along the total length of travel, even with unbalanced loads.
- B. Carriage System Design and Features: The carriage system consists of a formed structural steel frame with machined and balanced wheels riding on unlevelled steel rails [recessed] [surface] mounted to the floor. Rails shall be types selected by the manufacturer to ensure smooth operation and self-centering of mobile storage units during travel without end play or binding. Rail types, quantities and spacing shall be selected by the manufacturer to suit installation conditions and requirements. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
- C. Movement Controls: Triple arm operating wheels with rotating hand knobs shall be provided on the accessible (drive) ends of shelf units, centered on the stanchion, located approximately 40 inches (1051MM) from the base of each unit to permit units to be moved to create a single aisle opening. Turning the handle transmits power through chain drive to drive wheels on each carriage.
- D. Drive System: The system shall be designed with a positive type mechanically-assisted drive which minimizes end play, ensures there is no play in the drive handle, and that carriages will stop without drifting.
 - 1. System shall include a chain sprocket drive system for each movable carriage to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads. All system components shall be selected to ensure a smooth, even movement along the entire carriage length. 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.
 - 2. A tensioning device shall be provided on each chain drive with provision for adjusting tension without removing stanchion covers.
 - 3. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
- E. Safety Features:
 - 1. Color-coded visual indicators shall provide verification that carriages are in a locked or unlocked mode.
 - 2. A single safety lock button, mounted on each operating wheel hub, will permit moving a carriage in either direction to create a new access aisle when pulled out (unlocked), or locking the carriage when pushed in.
- F. Finishes:
 - 1. Fabricated Metal Components And Assemblies: Manufacturer's standard powder coat paint finish.

1.5 PERFORMANCE REQUIREMENTS

- A. Design Requirements:
 - 1. Limit overall height to [____] inches [____] MM.

2. Limit overall length to [____] inches [____] MM.
- B. Ease of Movement: Provide mechanically assisted units capable of being moved by exerting a maximum horizontal force of 5 -10 pounds on the operating wheel.
- C. [Seismic Performance: Provide mobile storage units capable of withstanding the effects of earthquake movement when required by applicable building codes.]

1.6 SUBMITTALS

1. Submittals due with proposal, failure to do so will be cause for disqualification

- B. Product Data: Submit manufacturer's product literature and installation instructions for each type of shelving, track and installation accessory required. Include data substantiating that products to be furnished comply with requirements of the contract documents.
- C. Shop Drawings: Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of installation layout including clearances, spacings, and relation to adjacent construction in plan, elevation, and sections. Indicate clear exit and access aisle widths; access to concealed components; assemblies, connections, attachments, reinforcement, and anchorage; and deck details, edge conditions, and extent of finish flooring within area where units are to be installed.
 1. Show installation details at non-standard conditions. Furnish floor layouts, technical and installation manuals for every unit shipment with necessary dimensions for rail layout and system configuration at the project site. Include installed weight, load criteria, furnished specialties, and accessories.
 2. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures. Specifically include the following:
 - a. Location, position and configuration of tracks on all floors.
 - b. Plan layouts of positions of carriages, including all required clearances.
 - c. Details of shelving, indicating method and configuration of installation in carriages.
 3. Provide location and details of anchorage devices to be embedded in or fastened to other construction.
 4. Provide installation schedule and complete erection procedures to ensure proper installation.
- D. Samples: Provide example of each color and texture on actual substrate for each component to remain exposed after installation.
- E. Selection Samples: For initial selection of colors and textures, submit manufacturer's color charts consisting of actual product pieces, showing full range of colors and textures available.
- F. Warranty: Submit draft copy of proposed warranty for review by the [Architect] [Architect/Engineer] [Engineer] [Designer]. This warranty shall be in addition to and not a limitation of other rights the owner may have against the contractor under contract.
- G. Maintenance Data: Provide in form suitable for inclusion in maintenance manuals for mobile storage units. Data shall include operating and maintenance instructions, parts inventory listing, purchase source listing, emergency instructions, and related information.

1. Submit manufacturer's instructions for proper maintenance materials and procedures.
 2. Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use conditions. Include precautions against using materials and methods which may be detrimental to finishes and performance.
- H. [Reference List: Provide a list of recently installed mobile storage units to be visited by owner, architect, and contractor. Intent of list is to aid in verifying the suitability of manufacturer's products and comparison with materials and product specified in this section.]
- I. Bid Bond in the amount of 5% of the bid must be submitted with proposal. 100% performance/payment bond required by successful vendor.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage an experienced manufacturer who is ISO 9001 certified for the design, production, installation and service of carriage mounted high-density mobile storage units and support rails. Furnish certificate attesting manufacturer's ISO 9001 quality system registration.
1. Manufacturer must be ISO 9001:2008 certified for a minimum of 5 years. Certification from ISO required with proposal. Other ISO certifications not acceptable. Or submit entire detailed manufacturer's quality control program.
 2. Manufacturer must have a local dedicated Area Contractor / Dealer / Distributor actively servicing the location, with a proven track record of installing and servicing the manufacturers mechanical operated high-density storage systems.
 3. Submit documentation outlining the manufacturer's servicing Area Contractor/ Dealer/ Distributor's long-term commitment to the area, confirming that Area Contractor/ Dealer/ Distributor has the business plan, and financial strength to continue to service the high density storage system installation over its service life.
 4. System must be manufactured in the USA.
- B. Installer Qualifications: Engage an experienced installer who is a manufacturer's authorized representative for the specified products for installing carriages and anchoring shelving units to carriages.
1. Minimum Qualifications: 2-year experience installing systems of comparable size and complexity to specified project requirements.
 2. Guaranteed 24-hour service response time.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's instructions and recommendations for delivery, storage and handling requirements.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions before fabrication. Indicate verified measurements on Shop Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.

- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating mobile storage units. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.10 SEQUENCING AND SCHEDULING

- A. Sequencing: Coordinate storage shelving system installation with other work to minimize possibility of damage and soiling during remainder of construction period.
- B. Scheduling: Plan installation to commence after finishing operations, including painting have been completed.
- C. Built-In Items: Provide components which must be built in at a time which causes no delays general progress of the Work.
- D. Pre-installation Conference: Schedule and conduct conference on project site to review methods and procedures for installing mobile storage units including, but not limited to, the following:
 - 1. Review project conditions and levelness of flooring and other preparatory work performed under other contracts.
 - 2. Review and verify structural loading limitations.
 - 3. Recommended attendees include:
 - a. Owner's Representative.
 - b. Prime Contractor or representative.
 - c. The [Architect] [Architect/Engineer] [Engineer/Architect] [Engineer] [Designer].
 - d. Manufacturer's representative.
 - e. Subcontractors or installers whose work may affect, or be affected by, the work of this section.

1.11 WARRANTY

- A. Provide a written warranty, executed by Contractor, Installer, and Manufacturer, agreeing to repair or replace units which fail in materials or workmanship within the established warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have under General Condition's provisions of the Contract Documents.
- B. Warrant the entire movable compact shelving installation against defects in materials and workmanship for a period of one year from date of acceptance by the Owner.

1.12 [MAINTENANCE]

- A. [Provide manufacturer's extended maintenance agreement for [_____] [years] [months], commencing on the day the standard maintenance warranty ends.]

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: Products are based upon mobile shelving system products manufactured by Spacesaver Corporation. Spacesaver or equal as determined by owner/architect.

Contact: sales@bradfordsystems.com or by phone: 800-696-3453

2.2 BASIC MATERIALS

- A. General: Provide materials and quality of workmanship which meet or exceed established industry standards for products specified. Material thicknesses/gauges are manufacturer's option unless indicated otherwise.
- B. [Other]

2.3 MANUFACTURED COMPONENTS

- A. Rails:

1. TOP MOUNT: Rail shall be ASTM/AISI 4140 steel bar 4 1/2" (114mm) wide x 3/8" (9.5mm) high with black zinc finish. Rail edges shall be beveled down to a maximum of 3/16" (4.8mm) to allow for the rail to be transverse by material handling equipment. Rail shall disperse the wheel point loads to structural slab. Rail shall have two permanently mounted floor anchors maximum 15" (381mm) on center. Rails shall be installed on top of concrete slab and laid in a manor such that rail joints are staggered across all adjacent rail runs. Rail and carriage design allows concrete slab to be unlevelled at the following maximum variation of 3/16" (4.8mm) over any 2' (0.6m) rail run and 1/4" (6.4mm) maximum variation over any 10' (3.04m) rail run.

OR

2. RECESSED MOUNT: Rail shall be 4140 steel bar 4.00" (101.6mm) wide x 3/8" (9.5mm) high with black zinc finish. Rail shall disperse the wheel point loads to structural slab. Rail shall have two permanently mounted floor anchors maximum 15" (381mm) on center. Rail shall be installed recessed into concrete slab, flush to top of concrete slab, and laid in a manor such that rail joints are staggered across all adjacent rail runs. Rail and carriage design allows concrete slab to be unlevelled at the following maximum variation of 3/16" (4.8mm) over any 2' (0.6m) rail run and 1/4" (6.4mm) maximum variation over any 10' (3.04m) rail run.

- B. Carriages:

1. Assembled structural steel carriage base will have a minimum capacity of 7,000 lbs. (3,175 kg) Each wheel assembly shall be equipped with two wheels, minimum 5" (127mm) diameter steel wheels. Wheels are equipped with two permanently lubricated and shielded radial ball bearings. Wheel capacity 3,500 lbs (1,587kg) each. Wheels have solid steel axles of 1" in (25.4mm) diameter. Wheels shall be dual flange, all wheel guided. All carriage sections between wheel assemblies have integral cross bracing to maintain accepted tolerances for function of systems. Side profiles shall provide and maintain wheel assembly alignment and squareness. These profiles shall be pre-drilled at the factory but are bolted, and assembled on the job site as integral carriage members.

2. Structural steel side profiles shall be minimum 5.084" (129mm) high, 10 gauge (2.5mm).
3. Finish shall be powder coat paint.
4. Provide manufacturer's design movable carriages fabricated or bolted steel construction. Galvanized structural components and/or riveted carriages are unacceptable.

C. Drive / Guide System:

1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.
 - a. If line shafts are used, all wheels on one side of carriage shall drive.
 - b. If synchronized drives are used, a minimum of one wheel assembly driving both sides of carriage at center location required. Drive shaft shall exhibit no play or looseness over the entire length of that assembly.
2. Shafts: Solid steel tube.
3. Shaft Connections: Secured couplings.
4. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.

D. Accessories:

1. [(Optional) B-Rail w/Floor and ramp: Provides leveled rail.]
2. [(Optional) L-Rail w/floor and ramp (dual flange only) Provides leveled rail.]
3. [(Optional) BAT w/Floor and ramp: Provides leveled rail.]
4. [(Optional) T-Rail w/ or w/o Floor & Ramp: Provides leveled rail.]
5. [(Optional) Wheelhouse Floorless: Surface mount (load restrictions)]
6. [(Optional) Wheelhouse Floorless w/shim kit: Surface mount (load restrictions)]
7. [(Optional) Wheelhouse Floorless Anti-Tip: Surface mount (load restrictions)]
8. [(Optional) Wheelhouse Floorless Anti-Tip w/shim kit: Surface mount (load restrictions)]

2.4 FABRICATION

- A. General: Coordinate fabrication and delivery to ensure no delay in progress of the Work.
- B. Wheels: Provide precision machined and balanced units with permanently shielded and lubricated bearings.
- C. Shelving, Supports and Accessories: See individual descriptions in "Shelving" paragraphs.

2.5 SHELIVING / RACK (INSERT FOR EACH SPECIFIC PROJECT)

2.6 FINISHES

- A. Colors: [Selected from manufacturer's standard available colors.] [Provide in custom colors as selected by [Architect] [Architect/Engineer] [Engineer.]

- B. Paint Finish: Provide factory applied electrostatic powder coat paint.
- C. Finish is to be archive quality, non-reactive, solvent-free, baked polyester powder coating and will have no potential off-gassing
- D. Solvent based wet-spray paint finishes on any components in the entire installation are unacceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine floor surfaces with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of mobile storage units.
- B. Verify that building structural system is adequate for installing mobile storage units at locations indicated on approved shop drawings.
 - 1. [In new construction, ensure that recesses for rails in floors are at proper spacing and depths.]
 - 2. [For installations on existing floors, ensure that rail spacings indicated on shop drawings are in proper locations so existing load-bearing structural members are not over stressed.]
- C. Verify that intended installation locations of mobile storage units will not interfere with nor block established required exit paths or similar means of egress once units are installed.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to proper performance of mobile storage units, once installed.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Rails:
 - 1. Install rail.
 - 2. Permanently attach shelving units to carriages. Stabilize shelving units to comply with mobile storage unit manufacturer's written requirements. Reinforce shelving units to withstand the stress of movement where required and specified.
 - 3. Install mobile storage systems, shelving, track, floors, and accessories after finishing operations, including painting have been completed. Install system to comply with final layout drawings, in strict compliance with manufacturer's printed instructions. Position unit's level, plumb; at proper location relative to adjoining units and related work.
 - 4. Field Quality Control: Remove and replace components which are shipped, 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.

5. Adjust: Adjust components and accessories to provide smoothly operating, visually acceptable installation.
6. Cleaning: Immediately upon completion of installation, clean 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.
7. Protection: Protect system against damage during remainder of construction period. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion

3.3 FIELD QUALITY CONTROL

- A. Verify shelving/racking unit alignment and plumb after installation. Correct if required following manufacturer's instructions.
- B. Remove components which are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

3.4 ADJUSTING

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

3.5 CLEANING

- A. 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.

3.6 DEMONSTRATION/TRAINING

- A. Schedule and conduct demonstration of installed equipment and features with Owner's personnel.
- B. Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end user personnel would normally perform.

3.7 PROTECTION

- A. Protect system against damage during remainder of construction period. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

END OF SECTION