Please Note: These specifications may or may not include available options including features, dimensions, etc. To customize and modify these specifications for your specific application, please contact Dave Bradford at 847-344-8989 or [dave@bradfordsystems.com](mailto:dave@bradfordsystems.com)

REQUEST FOR PROPOSAL

MOBILIZED STORAGE SYSTEM

PERFORMANCE SPECIFICATIONS

1. GENERAL
   1. RELATED DOCUMENTS
      1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section. Attachments: 1) Proposal Form reflecting base proposal and all required alternatives (Insert); 2) General and Supplemental Conditions (Insert)**.**
   2. SUMMARY
      1. This Section includes the following:
         1. Electric high-density mobilized storage units with carriage-mounted shelving. 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.
      2. 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].
         3. Power wiring to units from adequate power supply. Final connection to units shall be provided by [installer][electrician].
         4. Fire suppression system by others.
      3. Related Sections:
         1. [Section 03300 – Concrete Work]
         2. [Sections in Division 9 – Finishes, relating to finish floor and base materials].
      4. Allowances:
      5. Alternates:
   3. REFERENCES
      1. American National Standards Institute (ANSI) Standards:
         1. Applicable standards for fasteners used for assembly
      2. American Society for Testing and Materials (ASTM) Standards:
         1. Applicable standards for steel materials used for fabrication.
      3. American Institute of Steel Construction (AISC) Standards:
         1. Applicable standards for steel materials used for fabrication.
      4. Underwriters’ Laboratories (C-UL US):
         1. Listings for electrical equipment and devices described in this specification.
   4. SYSTEM DESCRIPION
      1. 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 moving units until the desired aisle is opened. The manufacturer’s proprietary unit interlock system prevents units from being moved while the open aisle is occupied. The carriage/rail system provides uniform carriage movement along the total length of travel, even with unbalanced loads.
      2. Operating environment: Design options shall allow the carriage system to operate in the following environmental conditions.
         1. System controls shall operate at room temperatures between 32゜F (0゜C) and 122゜F (50゜C).
         2. System controls shall operate at room temperature between 32゜F (0゜C) and -20゜F (-28.88゜C).
      3. Carriage System Design and Features: The carriage system consists of a formed structural steel frame with [hardened steel] [ductile iron] wheels riding on 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.
      4. Movement Controls: Provide a carriage control panel on the accessible (open) end of each moveable carriage, located approx... 39 inches (990.6 mm) above the base, centered on the control panel. Minimum controls shall include directional control buttons, STOP/RESET push-button and a red reset light.
         1. System controls shall start motors on each movable carriage [“sequentially” to minimize power demands] [“block” to start all at once] and shall provide dynamic braking to provide smooth operation. No additional hardware shall be required to change between “sequential” and “block” movement. Maximum running speed shall be limited to 3.3 inches (84 mm) per second.
         2. Provide solid state controls and indicator lights for a visual indication of safety system operation. Provide each aisle with a programmable distance sensor to ensure proper timing for start/stop operation.
         3. Pushing the directional control button on any moveable carriage adjacent to the desired aisle location in the direction away from the desired aisle location opens the system at the desired aisle. The selected aisle shall open automatically regardless of the position of the carriages. [Manual Reset: The carriage control head will display a flashing red reset light at the newly opened aisle indicating that the aisle is locked open and requires resetting before another aisle can be opened. Provide for automatic lockout and manual reset of controls if selected aisle is not moved within a preset period of time.] [(Optional) Automatic Reset: The carriage control heads will display a constant green light at all carriages indicating that the system is ready for the next aisle access]
         4. Controls shall feature back lit message indicating which aisle is in use (i.e. “Right Aisle in use” or “Left Aisle in use”).
         5. Each control head shall be protected (shielded) by a 12 gauge cover guard.
         6. [(Optional) Infrared Capable Controls and Infrared Remote Control Keys: Provide infrared capable control panel at end of each motorized carriage and [one] [two] [additional] hand held infrared remote control user key(s).] (In lieu of standard control moveable on carriage.)
      5. Drive System: The system shall be designed with a positive type motorized drive which minimizes end play and that carriages will stop without drifting. All system components shall be selected to ensure a smooth, even movement along the entire carriage length.
         1. Each electric carriage shall be provided with a current limited fractional horsepower gear motor, connected to drive wheel assembly with a roller chain.
         2. System shall include a chain sprocket drive system to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads.
         3. A tensioning device shall be provided on each chain drive (when applicable).
         4. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
         5. System shall operate on 115 V.A.C. 50/60 hertz, 20 amp dedicated circuit provided by others, one per module.
         6. Rear or front mounted buss bar power distribution system or overhead mounted power pantograph distribution system to conceal all interconnecting wiring shall be available. (note: power distribution systems are dependent on type of shelving/storage equipment contact manufacturer for details)
      6. Safety Features:
         1. Visual indicators shall provide verification that carriages are in the locked or unlocked mode.
         2. Two safety sweeps shall be provided in each aisle. A full-length infrared photoelectric safety sweep shall be provided to stop carriage movement if the sweep contacts an obstruction while in motion. Sweep must be equipped with OSHA approved safety demarcation tape.
         3. Infrared photoelectric aisle entry sensor system shall be provided to stop carriage movement if the system detects persons entering a closing aisle.
         4. Entire system shall be C-UL US system listed.
         5. [(Optional) An Automatic Battery Backup shall be provided for emergency operations in case of primary power failure.]
         6. [(Optional) A handheld rechargeable power pack shall be provided for emergency operations in case of primary power failure.]
      7. Finishes:
         1. Fabricated Metal Components And Assemblies: Manufacturer’s standard powder coat paint finish.
   5. PERFORMANCE REQUIREMENTS
      1. Design Requirements:
         1. Limit overall height to [\_\_\_\_] inches [\_\_\_\_] MM.
         2. Limit overall length to [\_\_\_\_] inches [\_\_\_\_] MM.
      2. [Seismic Performance: Provide mobile storage units capable of withstanding the effects of earthquake movement when required by applicable building codes.]
   6. SUBMITTALS
      1. Submittals due with proposal, failure to do so will be cause for disqualification
      2. 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 specifications.
      3. Shop Drawings: Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of installation layout including clearances, spacing, 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:
            1. Location, position and configuration of tracks on all floors.
            2. Plan layouts of positions of carriages, including all required clearances.
            3. 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.
      4. Samples: Provide sample color cards.
      5. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
      6. 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.
      7. 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.
      8. [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.]
      9. Bid Bond in the amount of 5% of the bid must be submitted with proposal. 100% performance/payment bond required by successful vendor.
   7. QUALITY ASSURANCE
      1. 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 of electric mobile systems must have a minimum of 35-years’ experience in the continuous manufacture of electrically operated mobile systems. Manufacturer certification required with bid.
         3. 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.
         4. 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.
         5. Manufacturer must submit c-UL-us total system listing number and UL card. System must be total system listed, not just components. Submit listing with proposal.
         6. System must be manufactured in the USA.
      2. 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.
   8. Delivery, Storage, and handling
      1. Follow manufacturer’s instructions and recommendations for delivery, storage and handling requirements.
   9. PROJECT CONDITIONS
      1. Field Measurements: Verify mobile storage unit location by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
      2. 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.
   10. Sequence & scheduling
       1. Sequencing: Coordinate storage shelving system installation with other work to minimize possibility of damage and soiling during remainder of construction period.
       2. Scheduling: Plan installation to commence after finishing operations, including painting have been completed.
       3. Built-In Items: Provide components which must be built in at a time which causes no delays general progress of the Work.
       4. 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:
             1. Owner's Representative.
             2. Prime Contractor or representative.
             3. The [Architect] [Architect/Engineer] [Engineer/Architect] [Engineer] [Designer].
             4. Manufacturer's representative.
             5. Subcontractors or installers whose work may affect, or be affected by, the work of this section.
   11. Warranty
       1. 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.
       2. 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.
   12. [MAINTENANCE]
       1. [Provide manufacturer’s extended maintenance agreement for [\_\_\_\_] [years] [months], commencing on the day the standard maintenance warranty ends.]
2. PRODUCTS
   1. MANUFACTURER
      1. Spacesaver Corporation, 1450 Janesville Avenue, Fort Atkinson, WI 53538. Spacesaver or equal as determined by owner/architect. For pricing, contact David Bradford at 847-344-8989 or [dave@bradfordsystems.com](mailto:dave@bradfordsystems.com)
   2. BASIC MATERIALS
      1. 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.
      2. Basis of Design: Products are based upon Spacesaver Corporation’s ActivRAC Mobilized Storage System. Provide only products complying with all specifications and requirements of the contract documents specifications. All specifications are mandatory, and are developed based on extensive research of customer’s requirements. If products deviate in any way, vendor must submit, without exception, the deviation for evaluation. Failing to do so will be grounds for rejection of proposal.
      3. [Other]
   3. SYSTEM OPERATION
      1. Open an aisle with one-touch, user-friendly, directional operation (at the carriage mounted control or via optional infrared or RF remote control aboard a fork truck).
      2. Press a safety “Stop/Reset” button to immediately stop any moving carriage(s).
      3. Easily distinguish a system’s operational status via the lighted indicators on each carriage.
      4. Be protected by in-aisle safety devices that stop carriage movement when a person or object (i.e., box, ladder, or fork truck) is detected.
      5. When carriages are in motion, any safety activation (photo sweeps and aisle entry sensors) will stop the aisle from closing on that aisle and the mobile carriage LED indicators will illuminate flashing red on both sides of the aisle where the safety was activated.
      6. Depressing any “Stop/Reset” button during carriage movement will bring all carriages to a stop.
      7. After carriages complete their movement the open aisle will be locked out and the control head indicator on either side of the open aisle will illuminate “Aisle in Use” – it’s now safe to enter the aisle.
   4. Manufactured components
      1. Rails:
         1. TOP MOUNT: Rail shall be 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 transversed 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 unlevel 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

* + - 1. 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 unlevel 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.
    1. Mobile 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.
    2. Drive / Guide System:
       1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.
       2. Drive: Line shaft driven carriages, all wheels on one side of carriage shall drive.
       3. Shafts: Solid steel tube.
       4. Shaft Connections: Secured couplings.
       5. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.
    3. Power and Controls:
       1. System power requirements - 120 VAC single phase input. Powered carriages shall be equipped with 1/8 HP; 90-volt DC gear motors.
       2. Multiple carriages shall be moved with a single activation of a carriage control and/or via an infrared or RF remote. Each carriage shall be equipped with one or more 1/8 HP, 90-volt DC gear motors, depending on load rating. Each independent drive shall be synchronous and current limiting to maintain proper alignment through closed loop motor feedback and control on all individual motors within the carriage regardless of length or weight load and eliminate racking and binding. Motor and motor controllers shall provide for soft-start/soft-stop movement, current limiting, and automatic time-out. Carriage movement to be selectable between sequential to minimize power demands on start-up, or block movement for faster access Motors and power train shall provide for maximum carriage travel speed of 3” (76mm) per second. All power transfer to wheels to be done by chain drive. Power to mobile units provided by an overhead buss bar system. Communication between carriages is provided by overhead cable festoon. Power supply to be provided by others.
    4. SAFETY FEATURES: (The following safety features are to be provided.)
       1. Photoelectric safety sweep scanning the full length of both sides of each carriage. The sweep will prevent or immediately stop movement if an obstruction is encountered or the beam is broken.
       2. Photoelectric aisle entry sensor shall be positioned at each entry location. The aisle entry beam will prevent or immediately stop movement if an obstruction is encountered or the beam is broken. Status of the safeties to be displayed on the control unit.
       3. Stop pushbutton shall be provided at each aisle control. A warning horn shall be provided whereupon activation of an aisle movement pushbutton it will sound for the first 3 seconds of carriage movement. A flashing yellow warning light is provided on the carriage ends that will flash during system movement.
    5. 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.]
  1. FABRICATION
     1. General: Coordinate fabrication and delivery to ensure no delay in progress of the Work.
     2. Wheels: Provide precision machined and balanced units with permanently shielded and lubricated bearings.
     3. Shelving, Supports and Accessories: See individual descriptions in “Shelving” paragraphs.
  2. SHELVING / RACK (Insert for each specific project)
  3. FINISHES
     1. Colors: [Selected from manufacturer’s standard available colors.] [Provide in custom colors as selected by [Architect] [Architect/Engineer] [Engineer.]
     2. Paint Finish: Provide factory applied electrostatic powder coat paint.
     3. Finish is to be archive quality, non-reactive, solvent-free, baked polyester powder coating and will have no potential off-gassing
     4. Solvent based wet-spray paint finishes on any components in the entire installation are unacceptable.

1. EXECUTION
   1. EXAMINATION
      1. Examine floor surfaces, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of mobile storage units.
      2. 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 floor are at proper spacing and depths.]
         2. [For installations on existing floors, ensure that rail spacing indicated on shop drawings are in proper locations so existing load-bearing structural members are not over stressed.]
      3. 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.
      4. Prepare written report, endorsed by Installer, listing conditions detrimental to proper performance of mobile storage units, once installed.
      5. Proceed with installation only after unsatisfactory conditions have been corrected.
   2. INSTALLATION
      1. 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 units 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. FIELD QUALITY CONTROL
      1. Verify shelving/racking unit alignment and plumb after installation. Correct if required following manufacturer’s instructions.
      2. 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.
   4. ADJUSTING
      1. Adjust components and accessories to provide smoothly operating, visually acceptable installation.
   5. CLEANING
      1. 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.
   6. DEMONSTRATION / CUSTOMER TRAINING
      1. Schedule and conduct demonstration of installed equipment and features with Owner's personnel.
      2. 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.
   7. Protection
      1. Protect system against damage during remainder of construction period. Advise Owener of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

END OF SECTION