

- STORAGE EQUIPMENT

* ALL FIELDS IN [] MUST BE EDITED.

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. Mechanical assist carriage mounted high-density mobile storage units, support rails, fabrication and installation including leveling of support rails.
 - 2. Art storage screens units, fabrication and installation on mobile carriages.
- B. Related Work, Not Furnished:
 - 1. Structural floor system capable of supporting loads required by prevailing building codes, including loads of storage units to be installed. Provide a maximum allowable sub floor deflection of L/480 under specified storage loads.
 - 2. Finish floor covering and edging materials and installation on raised floors and ramps, or when on concrete with recessed rail installation.
 - 3. Fire suppression system is by others
- C. Related Sections:
 - 1. [Section 033000 – Concrete Work]
 - 2. [Sections in Division 9 – Finishes, relating to finish floor and base materials.]
- D. Allowances:
- E. Alternates

1.3. PERFORMANCE REQUIREMENTS

- A. Due to the user's preference and requirements for safety, performance, and flexibility, all following specification line items are mandatory.
- B. Seismic Performance: Provide art screens capable of withstanding the effects of earthquake motions as determined according to IBC 2006 and local building codes.
- C. Design Requirements: All elevations as [per attached drawings] or [described in the specifications].
- D. Color Samples: Provide sample for each exposed product and for each color required.
- E. Selection Samples: For selection of colors and textures, submit manufacturer's color charts consisting of actual product samples, showing full range of colors and textures available. Vendors must provide a minimum of 12 color selections in powder coat paint finish.

- F. Installer Qualifications: Engage an experienced installer who is the manufacturer's authorized and certified representative.
1. Minimum Qualifications: 1-year experience installing systems of similar size and complexity to specified project requirements
 2. Manufacturer Certification: Required by manufacturer on manufacturer's letterhead required at time of bid. Certifications by sales representatives, dealers, or distributors are unacceptable. Qualification must include resume of certified installation supervisor.
 3. Provide support within 24 hours for service call.

- G. 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.

Lifetime Limited Warranty: For the lifetime of the shelving and mobile carriages ("structural frames"). For the purposes of this warranty, structural frames shall be deemed to exclude all moving parts, controls and guides that have immediate contact with any moving parts.

5-year Limited Warranty: For five (5) years from the date written hereafter*, for all equipment, other than structural frames and motors. During the 5-year warranty period, all parts are included at no cost for 5 years. Labor installation is included at no cost during the first year of the 5-year warranty period.

* 5-year limited warranty is applicable from the date of invoice. Warranty registration must be completed by the end-user at www.montel.com. As indicated on the registration form, registration constitutes the customer's written acceptance of installation.

- H. Reference List: Provide a list of three (3) minimum art screens storage installations to be contacted or visited by owner, architect and contractor. Installation must be of similar size, scope of specified system. Visit is intended to inspect operation, quality of installation and verify the suitability of manufacturer's products and comparison with materials and products specified. Manufacturer is required to address all issues raised by owner, architect and contractor. List must include contact names, phone numbers or e-mails, size and quantity of shelving units.
- I. LEED Data: Provide complete environmental data included recycled material content, VOC data, and other product related information. Describe all manufacturing processes or policies that contribute to environmental sustainability
- J. Project Schedule: Provide a project achievement plan detailing all critical elements necessary to plan, manufacture, ship, and install shelving product. Include critical project milestones and risk mitigation plan.
- K. Manufacturer Qualifications:
1. ISO 9001:2008: Engage an experienced manufacturer who is ISO 9001:2008 certified for the design, production, installation and service of powered mobile systems. Submit manufacturer's ISO 9001:2008 quality system registration certificate.
 2. ISO 14001:2004: Engage an experienced manufacturer who is ISO 14001:2004 certified. This international standard defines a process for monitoring and improving an organization's environmental performance. This process minimizes adverse impacts on the environment caused by the activities of the enterprise and helps to continually improve the environmental performance of the organization. Submit manufacturer's ISO 14001:2004 registration certificate, certifying the environmental performance of manufacturer.

1.4. SUBMITTALS

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- A. Product Data: Submit manufacturer's product literature, schematics, testing data, and other items as described in this specification. Include data substantiating that products to be furnished comply completely with requirements of the contract documents and specifications. Include installed weight, load criteria, furnished specialties, and accessories.
- B. Shop Drawings: Prepared and detailing fabrication, assembly, and installation of art screens, as well as procedures and diagrams. Include details of layout and installation, as well as clearances, spacing, relation to adjacent construction in plan, elevation, and section, components, assemblies, connections, attachments, reinforcements, and anchorage. Furnish floor layouts, technical, and installation manuals for every unit shipment.

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

- A. Manufacturer Certifications: Provide written certification by manufacturer on manufacturer's letterhead at time of bid required stating compliance with all specifications of art screens systems. Art screens certifications must confirm compliance with all shelf sizes and gauges as noted in these specifications.

1.6. PROJECT CONDITIONS

- A. Field Measurements: Verify art screens 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 art screens 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 art screens system installation with other work to minimize possibility of damage and soiling during remainder of construction period.
- D. Pre-Installation Conference: Conduct conference at project site. Review methods and procedures related to installation of mobile carriage and 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] [Architect/Engineer] [Engineer/Architect] [Engineer] [Designer].
 - d. Manufacturer's representative.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- A. General: Products are based on art screens storage units products manufactured by Montel Inc. Contingent on meeting all specification requirements, other acceptable manufacturers may be

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included.

2.2. BASIC MATERIALS

A. Grout:

1. General: The compound shall be hydraulic type cement which, when mixed with water, will harden to produce a permanent bolt setting anchor. The compound shall conform to the following specifications, all of which are based on the performance of the test specimens at room temperature and in laboratory environment.
2. Linear Movement: It shall not shrink on setting, but shall exhibit a slight expansion of not more than .002 inch per linear inch.
3. Compression Strength: Two (2) inch cubes made in accordance with ASTM standards tested on a Balding-Southward machine of 60,000 pounds capacity shall have the following minimum average compression strengths:
Age: 1 hour - 4,500 PSI
7 days - 8,000 PSI
4. All tracks shall be grouted the entire length of each run, including all track joints. As the grout slightly expands during the cure process, it shall be in permanent contact with the grouted structural members. This provides a continuous support to the system, and optimal weight distribution on the existing floor slab.

2.3. MANUFACTURED COMPONENTS – ART STORAGE SCREENS

A. Mesh screens:

1. Mesh Assembly: A mesh assembly shall be made of a 4 pieces metal frame welded to 2 metal grids, which make a double-sided assembly. The pieces of the metal frame are U shaped 1.25" (32mm) x 1.188" (30mm) and made of 16-gauge steel. Depending on the size of the mesh assembly one or several 1/2" (13mm) x 1.188" (30mm) U shaped reinforcements are added to the main frame. The grid is made of 0.070" thick steel expanded surface and has diamond-shaped openings of 1.755" (44.6mm) wide x 0.637" (16mm) high. The load capacity shall be 7,5 pounds per square foot (36.6 kg per square meter) on each side.
2. Connector and perimeter channels: Mesh assemblies shall be linked together by means of 16 gauge connector and perimeter channels. An H shaped 2 3/4" (70mm) x 1 9/16" (40mm) joint makes the link between two mesh screens. At the top, front and rear extremities 1 3/8" (35mm) x 1 9/16" (40mm) U shaped steel parts provide a smooth finish.

B. [(Optional) Hooks: Different types of hooks shall be available to meet items holding requirements. S shaped wire hooks shall be used for regular applications. A flat and a 90 degrees models shall be available. For heavier applications, W shaped hooks are also available. S and W hooks shall hold in place with gravity. For a secured application, shorts and longs L shaped fixtures shall be used. The L shaped hooks are mounted on a diamond shaped support which rotates into the mesh diamond shape and is secured in place with a wing nut.]

2.4. MANUFACTURED COMPONENTS – MOBILE

A. Tracks:

1. Rail shall be made of minimum cold rolled steel (CRS) rail assembly of 3/4" (19mm) high x 1" (25mm) wide inserted in a corrosion resistant aluminum sub-rail of 1" (25mm) high x 3 1/4" (82.5mm). Rail contact surface shall be minimum 1" (25mm) wide. The inserted steel rail shall be replaceable.

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2. Sub-rails shall be leveled with self-leveling screws above or below the walking surface. Shims shall not be accepted.
3. In the sub-rail, the opening adjacent to rail which accommodate manufacturer's carriages guidance system and/or anti-tip system shall not exceed 7/16" (11mm) wide x 3/4" (19mm) deep.
4. All rail connections shall have interlock steel rail connectors. All sub-rail connections shall have interlock steel sub-rail connectors. All track connections shall be designed to provide horizontal and vertical continuity between rail/sub-rail sections, to gradually transfer the concentrated wheel point load to and from adjoining sections. To insure vertical and horizontal stability, tongue-and-groove connections are not permitted.
5. Tracks shall be layered and staggered to ensure a smooth weight transfer from one track to the other. Top-to-bottom track shall be without joints to support continuously the top steel rail at the junction point and provide greater structural rigidity. One-piece rails with tongue-and-groove joints and connections are not permitted.
6. Rail shall be located and positioned properly, leveled and grouted, allowing at least 1/4" (6mm) for grout under high point. Anti-slip grooves under sub-rail shall prevent track to slip when grout is poured. Grout shall infiltrate inside the grooves to anchor the sub-rail to the cement. Grout to be worked under rail, any voids completely filled and trimmed upsides and flush with rails. This allows proper weight distribution from rail to existing slab.
7. Levelness of rails: 3/32" (2mm) maximum variation from true level within any system; 1/16" (1.5mm) maximum variation between adjacent rails, perpendicular to rail direction; 1/32" (0.76mm) maximum variation in 10' 0" (3.05m) of rail length, along any rail.
8. Rails to be verified for integrity of position and levelness, as well as anchored into structural concrete slab, using anchors in sizes and quantities as determined by manufacturer.
9. Sub-rail section shall be a minimum of 12' foot (3.66m) each and rail section shall be provided in shorter section of 10' foot (3.07m). Shorter sections are used to complete each individual rail assembly
10. Built-in anti-tip device sub-rail shall be provided with the first two rails from the operator side of a system. [(Optional) Additional anti-tip devices shall be provided to meet local building code and high height-to-width ratio.]

B. Floor/Ramp (Choose 1 or 2):

1. [Surface Mounted Floor / Ramp]:
 - a. Finished elevation of the raised floor shall be flush with the top of the rails.
 - b. The ramp shall not extend beyond the end of the carriages and shall have a maximum slope of nine (9) degrees. The vertical transition from the ramp edge to the floor shall be a maximum of 1/8". Ramps shall extend under all movable and stationary ranges except as noted differently. Ramps shall be made of 12-gauge steel.
 - c. Floor panels shall be constructed of a minimum [5/8" (16mm)] or [3/4" (19mm)] thick, underlayment grade plywood. Floor panels must be provided between all rails the full-width of systems, except under stationary platforms.
 - d. [(Optional) The 3/4" (19mm) thick floor panels shall be manufactured with softwood fibers combined with formaldehyde-free synthetic resin, with basically no formaldehyde off-gassing.]

- e. Floor panels shall be provided with built-in floor anchor to provide a continuous leveled floor surface.
- f. The floor and ramp shall be constructed in a manner preventing any warping or deformation of the floor panels in a normal operating environment.
- g. Floor covering is to be installed and supplied by [the Owner] [others].

2. [Recessed]:

- a. Finished elevation of the raised floor shall be flush with the top of the rails.
- b. Track shall be protected with steel covers during the pouring process.
- c. Concrete topping shall be poured in order to fill the gap between existing slab and top of the track (NIC).

C. Carriages:

- 1. The mesh screen shall rest on a bottom guide. It is a 1 9/16" (40mm) x 1.383" (35mm) 16-gauge steel C shaped channel. The bottom guide is welded to the carriage which shall be 11" (279mm) wide, 1 1/2" (38mm) thick and made of 12-gauge steel with 2 bends on each side for stiffness. The carriage shall be equipped with hidden welded angle at both ends to joint carriages together.
- 2. Wheel support section shall be constructed of two (2) back-to-back 12-gauge "C" shape profiles 1 1/8" (28.5mm) deep x 4 1/2" (114mm) high welded together by means of 12-gauge steel end plates. A screwed top plate closes the assembly. A built-in anti-tip system shall prevent the system from tipping. The total length of the wheel support section shall be 22.21" (564mm), but alternating odd and even configurations shall permit to have a mobile at each 12" (305mm). The even configuration shall have the first wheel set at 8" (203mm) from the front end and the last wheel set at 18" (457mm) from the rear end. The odd configuration is inverted so the carriages fit into each other.
- 3. Bumpers: Non off-gassing silicone bumpers shall be fixed at each side of the carriages to act as a shock absorber.

D. Drive/Guide System:

- 1. Direct-Drive System: Provide with full-length drive shaft which prevents carriage whipping, binding and excessive wheel and rail wear under normal operation. All wheels shall be direct-driven at every rail location on one side of carriage. Synchronized drive with multiple chains, trolleys, and drive shafts are not acceptable.
- 2. Torque-Resistant Tubular Drive Shaft: Minimum of 7/8" (22mm) outside diameter by maximum 11/16" (29mm) inside diameter.
- 3. Dual-Flange Wheels: Provide positive guidance and tracking. Guidance requiring cam followers and ball bearings running on either side of the rail is unacceptable.
- 4. Narrow Guidance Channels: Provide a maximum 3/8" (9.5mm) between sub-rail and rail sections to reduce tripping hazards, allow carts to easily roll over, prevent debris accumulation, and facilitate cleaning.
- 5. T Shaped Guides: Made of 12-gauge steel, T shaped guides are welded at both top ends of perimeter channels in order to ease block movements and prevent fishtailing. The guide is made of 2 parts forming a closed tube 1 3/8" (35mm) high x 1.469" (37mm) wide x 11" (279mm) long. Bumpers are fixed at both ends.

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E. Wheels:

1. Wheels shall be constructed of solid minimum 1045 cold rolled steel (CRS) for smooth operation. Wheels shall be precision ground, balanced. All bearings shall be permanently shielded and lubricated. All wheels shall be minimum 5" (127mm) diameter (outside dimension). They shall be flat, dual-flanged and sloped to insure efficient guidance.

F. Face Panels:

1. Materials: All exposed face panels shall be steel. Face panels shall be located on all operating ends of ranges as shown on drawings.
2. Finishes: [Selected from manufacturer's standard available colors and patterns.] [(Optional) Selected by the [Architect] [Architect/Engineer] [Engineer] [Designer].]
3. Face panels must cover the full height and width of shelving.

G. Movement Controls:

1. The system shall be of the mechanical assist type having a chain sprocket drive system. A driving system is required to provide uniform movement along the total length of the carriage even with unbalanced loads on the carriage. The system shall be a positive drive to ensure that there is no play in the drive handle and the carriage will stop without drifting. All components of the system shall be compatible for smooth non-jerking, even movement along the total length of the carriage. Drive system shall have a minimum gear ratio requiring 1 pound of pressure to move a load of 6000 pounds. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
2. Operating handles shall be three-spoke type with zinc construction (single spoke and plastic or nylon handles are unacceptable) at 12" or 18 ¾" diameter transmitting power through a chain drive to the drive wheels. Provide operating handles on drive end of carriages as noted on drawings. Each mechanical device shall come with a chain-tensioning adjuster. Handle must mounted at 39½" from the bottom of the carriage.
3. [(Optional) Handle parts shall be non off-gassing.]

2.5. FINISH SPECIFICATIONS

- A. Shall be the finest of their respective kinds and those best adapted to the construction for which they are employed to meet ISO 9001:2008 quality standards. All steel shall be superior quality 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 powder coat finish. All steel parts shall be machined 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 and confirming 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 stored materials. 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 mobile storage units.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of mobile storage units.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2. INSTALLATION

- A. Install components and accessories after finishing operations, including painting, have been completed. Install shelving units to comply with final layout drawings, in strict compliance with manufacturer's printed instructions and structural calculations. Position unit's level and plumb at proper location relative to adjoining units and related work
- B. 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.
- C. Adjust: Adjust components and accessories to provide smoothly operating, visually acceptable installation.
- D. 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.
- E. Protection: Protect system against damage during remainder of construction period. Advise Owner of additional protection required to ensure shelving units will be without damage or deterioration at time of substantial completion.

3.3. DEMONSTRATION/CUSTOMER TRAINING

- A. Provide complete training to end-user's staff. Training shall include general safety and operation instructions, and basic preventative maintenance procedures.

END OF SECTION