Kansas State University

Hale Library – Repair and Restoration
Library Shelving

BUILDING NUMBER: 36700-00031
Manhattan, KANSAS

OFPM PROJECT NUMBER: A-013567
KSU PROJECT NUMBER: 2018-099
KSU AiM NUMBER: 1946 / 19-012835 / 001
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DOCUMENT A - NOTICE AND INSTRUCTION TO BIDDERS

PART 1 - GENERAL

1.1 ANNOUNCEMENT OF REQUEST FOR BIDS:

A. Kansas State University announces the request that Bids be submitted for the following construction:

Hale Library Repair and Restoration – Library Shelving
Building Number: 36700-00031
Manhattan, Kansas
2018-099

B. Award, when made, will be single Contract for the "Project as a whole" including all Work for total installation.

1.2 BID DOCUMENTS:

A. All tiers of bidders are responsible for understanding the full scope of work covered by the bid documents.

1.3 OBTAINING INFORMATION FOR BIDDERS:

A. Questions concerning the Construction Contract Documents (Drawings and Specifications) shall be addressed to the Design Team at:

Jennifer Goeke, Project Manager
PGAV Architects
PHONE: 913-362-6500
EMAIL ADDRESS: Jennifer.Goeke@pgav.com

1.4 EXAMINATION OF DOCUMENTS AND SITE:

A. Before submitting a bid, each bidder shall carefully examine all Construction Contract Documents pertaining to the work and visit the location of the work to verify conditions under which the work will be performed. Submission of a bid will be considered presumptive evidence the bidder is conversant with local facilities and difficulties, requirements of the Construction Contract Documents and pertinent State and/or local codes and the labor and material markets and that he has made due allowances in his bid for all contingencies. Failure to visit the location of the work may be grounds to reject a bid.

B. Include in bid all costs for labor, materials, equipment, fees, taxes, insurances and other contingencies, with overhead and profit, as necessary to produce a complete installation of the work specified under headings covered by the bid (including all trades specified) without further cost to the Owner.

1.5 PROJECT DOCUMENTS:

A. The Project documents consist of the following items:

1. Document A - Notice and Instructions to Bidders
2. Document D - General Conditions of the Contract
3. Division 1 Specification Sections – 01 0000 and 01 1000
4. Drawings (when included)
5. Technical Specifications
6. Addenda to Drawings and/or Specifications, duly issued
7. KSU Purchasing Department’s Request for Proposal and related Contractual documents
8. Notice to Proceed
9. Change Orders
10. Laws and regulations

1.6 INTERPRETATION OF PROJECT DOCUMENTS:
A. Should a bidder find discrepancies in or omissions from the Specifications and/or Drawings, or if there is doubt as to their meaning, the bidder shall advise the Project Architect/Engineer at once.
B. Requests for clarifications and interpretations of the Construction Contract Documents (Technical Specifications and Drawings) shall be presented to the Project Architect/Engineer in writing at least five (5) days prior to the date on which bids are to be opened.
C. Clarifications and interpretations of the Construction Contract Documents will be made only by Addenda issued to all known persons having same. The Project Architect/Engineer, state agency personnel or KSU Purchasing will not be responsible for providing any other explanation or interpretation of the Construction Contract Documents.
D. Any clarification or interpretations of the meaning of the Drawings, Specifications, or other pre-Bid Documents made orally to any Bidder shall not be used by the bidders in preparation of a bid amount unless confirmed in writing via an addendum.
E. Upon execution of the Contract, all addenda will become a part of the agreement.

1.7 NOTICE TO PROCEED:
A. A Notice to Proceed will be issued by Kansas State University upon receipt of the Contractor’s signed copy of the Contract and required bond and insurance documents.
B. Prior to the issuance of the Notice to Proceed, Kansas State University shall not be liable for any expenses relating to the bid or Contract, or any expenses related to their preparation.

1.8 CHANGE ORDERS:
A. Changes to the initial Contract are to be made by the Project Architect/Engineer with the approval of Kansas State University.

1.9 LAWS AND REGULATIONS:
A. All applicable laws of the State of Kansas, municipal ordinances and rules and regulations of all authorities having jurisdiction over construction of this Project shall apply to any Contract resulting from a bid on this Project as though herein written out in full.

1.10 PROJECT CLOSE OUT:
A. When the Contract is satisfactorily complete and authorized by Kansas State University and the Project Architect/Engineer, the Project Architect/Engineer will forward a formal Certificate of Project Completion and an Affidavit of Contractor to the Contractor.
B. The contractor will sign the Certificate of Project Completion and sign/notarize the Affidavit of Contractor to certify that all debts and claims against this project have either been paid in full or otherwise
satisfied. The contractor will forward both along with the final application for payment back to the architect/engineer.

1.11 PROJECT GUARANTEE:

A. The date of the Certificate of Project Completion shall be the starting date for the guarantee/warranty period, unless partial occupancy requires an earlier date to be set. In that case the guarantee/warranty period for work and equipment serving the occupied area shall begin on the date the Owner takes partial occupancy of that portion of the project.

1.12 REQUESTS FOR SUBSTITUTION PRIOR TO BID DATE:

A. Should a bidder or a manufacturer’s representative wish to incorporate, in the base proposal, brands or products other than those named in the Specifications, he shall submit written request for substitution approval to the Project Architect/Engineer at least seven (7) days prior to the date on which bids are to be opened. Approved substitutions will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

END OF DOCUMENT A
DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01 0000 – KANSAS STATE UNIVERSITY

REQUIREMENTS

PART 1 - GENERAL

1.0 OVERVIEW

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. In case of conflicts between the Kansas State University bidding requirements or Document A, C and Section 01 0000 and the technical specifications provided by the design team, the Kansas State University information prevails.

C. It shall be deemed that any Contractor accepting work covered in these specifications is familiar with the kind of work he undertakes, has carefully examined all contract documents and has been informed fully as to the location of the improvements and conditions under which the work is to be done, and the quality of the workmanship required.

1.2 COORDINATION WITH OWNER AND OWNER REQUIREMENTS

A. The Owner will make the necessary arrangements to cause the Work area to be available to the Contractor. Access and egress to the Work area shall be routes prescribed by the Owner and indicated in the Contract Documents.

B. The prospective Bidder shall visit the site and ascertain the extent of the Work to be done under the Contract and the conditions under which it must be performed.

C. The prospective Bidder shall make his own estimates and verify all dimensions of areas on the job.

D. The prospective Bidder shall familiarize himself with the Kansas State University traffic regulations and shall inform his workmen of these regulations and conditions. The Contractor and his workmen shall be responsible for knowing and following all KSU Traffic and Parking Regulations. Contact KSU Parking Services for regulations and availability of parking permits. KSU Parking Services can be reached at www.k-state.edu/parking/ or 785-532-7275.

E. Storage areas shall be as designated by the Owner and indicated in the Contract Documents.

F. Notify Owner not less than 72 hours in advance of activities that will affect Owner’s operations.

G. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by the Owner unless permitted under following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than 72 hours in advance of proposed utility interruptions
   2. Obtain Owner’s written permission before proceeding with utility interruptions.

H. The smoking of cigarettes, cigars, pipes or burning tobacco in any other form or device, as well as the use of electronic cigarettes, vaporizers, hookah or other water pipe devices, is prohibited on University property. This includes construction sites on University property, including all
interior and exterior spaces. Smokeless tobacco is prohibited in all buildings.

I. Contractor Code of Conduct – Contractor is expected to perform their work in a professional manner. Inappropriate language or gestures, profanity, or lewd conduct are strictly prohibited.

J. The Contractor shall follow Kansas State University Policy for Hot Work in Hot Work Areas. Contractor shall familiarize himself with Public Safety’s Policy and Procedure Manual Section 3755 and information available on Environmental Health and Safety Web site. (http://www.k-state.edu/policies/ppm/3700/3755.html and https://www.k-state.edu/safety/fire/hot-work/) Hot Work includes operations of cutting, welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch applied roof systems or other similar situations. Hot Work Area is the area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

1. Prior to beginning any Hot Work on University property, the Contractor’s representative shall obtain a Hot Work Permit from Environmental Health and Safety and inform University Project Manager. Hot Work permit request can be found at the following web site https://www.k-state.edu/safety/fire/hot-work/. Once issued, the permit must be displayed on the job site. The Contractor’s personnel are expected to adhere to all the guidelines set forth in the Policy and make reasonable effort to insure the health and safety of University employees, students and visitors.

2. A separate Hot Work Permit must be requested and approved for each contractor and each type of Hot Work.

1.3 PRE-INSTALLATION CONFERENCE

A. The successful Bidder shall agree to attend a pre-installation conference along with persons responsible for the various operations involved with the Project.

1.5 CERTIFICATE OF PROJECT COMPLETION

A. Upon final completion of the work under the Contract, a formal Certificate of Project Completion will be forwarded to the Contractor by the Architect/Engineer. The date of the certificate shall be the starting date of the guarantee or warranty period for all guarantees or warranties.

1.6 OPERATION AND MAINTENANCE DATA

A. Binder operation and maintenance data in 8-1/2” x 11” text pages in 3-ring binders.

B. Binder covers shall have printed title “OPERATION AND MAINTENANCE INSTRUCTIONS,” “title of project” and "project number."

C. Internally subdivide binder contents with permanent page dividers, logically organized, with tab titling clearly printed under reinforced laminated plastic tabs.

D. Submit a minimum of three (3) bound sets to the Architect/Engineer prior to the final inspection. Additionally, submit one electronic copy of the information provided in the binders (CD/DVD or flash drive).

PROJECT CLOSEOUT CHECKLIST

A. The document on the next page is for use by the project architect/engineer, contractor and Owner to verify all items related to final completion are provided before final payment is released to the contractor.
PROJECT CLOSEOUT CHECKLIST

CONTRACTOR MUST HAVE THE FOLLOWING ITEMS COMPLETED AND APPROVED TO RECEIVE FINAL PAYMENT.
Check when complete or write NA in the blank if not applicable

___ Punchlist items
___ All warranties and instructions have been delivered to the Owner.
___ All maintenance equipment and tools have been delivered to the Owner.
___ All extra materials and spare parts have been delivered to the Owner.
___ O and M manuals have been delivered to the project Architect/Engineer, have been reviewed for completeness and have been delivered to the Owner.
___ Training and demonstrations of as required by the specifications have been completed.
___ As-built Documents have been delivered to the project Architect/Engineer. (Reference Document D – General Conditions of the Contract Article 17 paragraph AA)
___ Final Cleaning has occurred to the satisfaction of the Owner and project Architect/Engineer.

A copy of this form shall be submitted to Kansas State University along with the Affidavit of Contractor & Certificate of Project Completion.

END OF SECTION 01 0000
DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01 1000 – SUMMARY

PART 1 - GENERAL

1.0 Summary

A. Section includes:
   a. Project Information
   b. Special Project Procedures / Installation Schedule

1.2 PROJECT INFORMATION

A. Project Identification: Hale Library Repair and Restoration – Library Shelving

B. Description Summary:

B. Owner: Kansas State University

   KSU CAMPUS PLANNING AND PROJECT MANAGEMENT
   PROJECT MANAGER: Jeremy Sharp
   1628 CLAFLIN ROAD, DYKSTRA HALL
   MANHATTAN, KS 66506-0903
   EDDRESS: jls4657@ksu.edu

C. Project Architect/Engineer and Address:
   Jennifer Goeke, Project Manager
   PGAV Architects
   PHONE: 913-362-6500
   EMAIL ADDRESS: Jennifer.Goeke@pgav.com

1.3 SPECIAL PROJECT PROCEDURES / INSTALLATION SCHEDULE

A. Shelving installer shall coordinate deliveries and installation with General Contractor for the Repair and Renovation project.

B. Delivery of 3rd and 4th floor shelving (static and mobile) – Space will be available for installation June 15, 2020.

C. Installation of 3rd and 4th floor shelving is to be complete by July 31, 2020.

D. Delivery of 1927 building shelving (juvenile literature, periodicals, DOW center, Innovation Lab mobile system) – Space will be available for installation November 16, 2020.

E. Installation to be complete by December 4, 2020.

END OF SECTION 01 1000
SECTION 105613 - STORAGE SHELVING AND STORAGE CABINETS

PART 1 - GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Cantilever fixed shelving units, fabrication and installation including leveling.
   2. Wood Shelving
   3. Metal Storage Cabinets
   4. Book supports for existing shelving
   5. Coordination with General Contractor. Final layout of system and coordination with General Contractor for provision of wall blocking where required.
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.

1.2 COORDINATION
A. Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.
B. Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

1.3 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
   1. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal storage shelving.
B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.
   2. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
C. Shop Drawings: For Storage Shelving.
   1. Include plans, elevations, sections, and attachment details.
   2. Include installation details of connectors, lateral bracing, and special bracing.
D. Samples: For each type of metal storage shelving and for each color specified, in the following sizes:
   1. Vertical Supports: 12 inches (305 mm) tall.
   2. Shelves: Full size, but not more than 24 inches wide by 12 inches deep (610 mm wide by 305 mm deep).
E. Samples for Initial Selection: For each type of metal storage shelving with factory-applied color finishes.
   1. Include Samples of accessories involving color selection.
F. Samples for Verification: For the following components, of size indicated below:
   1. Vertical Supports: 12 inches (305 mm) tall.
   2. Shelves: Full size, but not more than 24 inches wide by 12 inches deep (610 mm wide by 305 mm deep).
G. Product Schedule: For metal storage shelving.
H. Delegated-Design Submittal: For seismic restraint of metal storage shelving.

1.5 INFORMATIONAL SUBMITTALS
A. Qualification Data: For Installer.
B. Seismic Qualification Certificates: For metal storage shelving, accessories, and components, from manufacturer.
C. Product Certificates: For each type of metal storage shelving.
D. Warranty: Submit a written warranty, executed by the 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, no limitations of other rights the owner may have against the contractor under contract documents.
   1. Lifetime Limited Warranty: The entire shelving installation will be warranted against defects in materials for the life of the installation from the date of acceptance by the Owner.
E. 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.
1.6 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For metal storage shelving to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS
   A. Furnish extra materials that match products installed and that are packaged with protective covering for storage
      and identified with labels describing contents.
      1. Shelves: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 5
         shelves.
      2. Shelf-to-Post Connectors: Full-size units equal to 5 percent of amount installed for each type indicated, but no
         fewer than 10 connectors.

1.8 QUALITY ASSURANCE
   A. Submissions due from all bidding contractors at time of bid, failure to do so shall be cause for disqualification.
      1. Manufacturer Certifications: Provide written certification by manufacturer on manufacturer’s letterhead at time
         of bid required stating compliance with all specifications of shelving systems. Shelving certifications must
         confirm compliance with all shelf sizes and gauges as noted in these specifications.
      2. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.9 PROJECT CONDITIONS
   A. Field Measurements: Verify shelving 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. Establish Dimensions: Where field measurements cannot be made without delaying the Work, establish
         dimensions and proceed with fabricating shelving units without field measurements. Coordinate construction to
         ensure actual dimensions correspond to established dimensions.
   B. Environmental Limitations: Do not deliver or install metal storage shelving until spaces are enclosed and
      weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining
      ambient temperature and humidity conditions at levels intended for building occupants during the remainder of the
      construction period.
   C. Sequence & Scheduling: Sequence storage shelving system installation with other work to minimize possibility of
      damage and soiling during remainder of construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
   A. Delegated Design: Design metal storage shelving, including comprehensive engineering analysis by a qualified
      professional engineer, using performance requirements and design criteria indicated.

2.2 MANUFACTURED COMPONENTS – SHELVING
   A. Manufacturers:
      1. Basis of Design – Metal Cantilever Shelving: Products are based on shelving systems provided by Estey a
         division of the Tennsco Corporation supplied / installed by H2I. Contingent on meeting all specification
         requirements, other approved manufacturers are:
         a. Spacesaver Corporation
      2. Basis of Design - Wood Shelving: Products are based on solid wood shelving systems manufactured by The
         Worden Company as supplied / installed by H2I. Contingent on meeting all specification requirements, other
         approved manufacturers are:
         a. Spacesaver Corporation
   B. Metal Cantilever Shelving
      1. Welded Frame Upright:
         a. Formed of 16-gauge steel into a channel shape with 1/2" stiffening flanges, the channel to measure 2 1/2"
            in the web and 1 1/4" across the front and rear faces. They present a smooth, closed box shape in cross
            section with either right angle bends when bolted to the adjoining column of the next unit or bolted to an
            end cover. When bolted to adjacent welded frames, exposed open channels of uprights are unacceptable.
            Each column is 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 are 5/8” on lateral centers. Columns are marked every three (3) inches to facilitate visual
            positioning and adjustment of shelves. Corresponding holes for bolting columns into ranges are provided.
            Two (2) uprights are required for each section of a range, since no adjacent sections may share a common
            upright and be truly modular. Bolted column uprights must create a vertical concealed chase for wiring and
            cabling.
         b. Top Spreader Tube: Formed of not less than 14 gauge tubular steel measuring 1” x 3” in cross section.
            The spreader is electrically welded to the uprights to permit unit arrangements and maximum non-sway
            capabilities.
c. Bottom Spreader: Formed, channel shape measuring 1" x 1-3/4" in cross section and consists of not less than 16-gauge steel. The outer ends of the channel are punched to receive leveling nuts and floor levelers. The bottom channel is electrically welded to the uprights with the open face of the channel positioned upward. Weld Frames heights are as specified, widths are 36" standard. Weld frames are equipped with two (2) adjustable floor levelers. Levelers can be provided with an optional elastomeric plastic shoe to prevent "walking" of units. Levelers are either inverted hex head mushroom type standard for regular floors or conical (pin) point type, optional.

d. Non-welded frame cantilever type shelving units are unacceptable.

2. Base Support Brackets:
   a. Closed Base Brackets: Designed to fit snugly in and around the welded frame upright. Material is no less than 16-gauge steel. Brackets have a 90-degree flange at the bottom to rest on the floor covering. Hardware for leveling the book stack is included. Top and front edge of the base bracket are flanged outward approximately 1/4". The profile of the bracket matches that of the adjustable shelf end bracket. The embossed area incorporates a hole to allow attaching of adjoining base brackets with a fastener.

3. Shelf End Brackets:
   a. Formed of not less than 16-gauge steel; with all but the rear edge flared outward approximately 1/4". The rear edge has two crimped hooks at the top for engaging frame upright slots, and a positioning tab at the bottom to prevent accidental dislodgement. The bracket incorporates two lances with protruding dimples in the sides for securing shelf side flanges. Bracket design allow for shelf adjustment upward and downward (i.e. "walking the shelf") without disturbing any of the other shelves. Bracket emboss prevents overlapping of adjoining brackets. Brackets extend at least 6" above the shelf surface as noted on drawings.

4. Base Shelves for Static:
   a. Closed Base Shelves: formed from not less than 18-gauge steel into a one-piece construction designed to fit snugly around base brackets without the need for fasteners. Front height is 3-5/16", and sides have stiffening flanges.
      1) Closed Base Shelves, single face and double face
      2) Integral Back Base Shelves, single face and double face., built in 2” backstop
      3) Sloping Base Shelves, single face and double face
      4) Closed Base Shelves with Dividers, single face and double face
      5) Periodical Base Shelves: single face and double face. Sloped display surface is 14" high and hinged for easy access to back issues.

5. Adjustable Shelves for Static:
   a. Formed from not less than 18-gauge steel with the front and rear edges having a box-formed, 13/16" high profile. The nominal depth of the shelf is 1" greater than actual dimension. The sides of the shelf are flanged to locking into the base brackets without the use of fasteners.
      1) Plain / Adjustable Shelves
      2) Storage Shelves: flat shelf
      3) One-piece Divider Shelves: Formed with 18-gauge steel into a one-piece construction with the front edge having a box-formed, 13/16" high profile. The rear edge is formed up to create a 6" integral back. Shelf and integral back are slotted on 1" centers to accept adjustable dividers. The nominal depth of the shelf is 1" greater than the actual dimension. The sides of the shelf are flanged for locking into end bracket lances. Shelves are capable of supporting 50 lbs. per linear foot without deflection in excess of 3/16" Standard quantity and size of divider is five, (5) per shelf with an overall height of 7-7/16".
      4) Pivoting Periodical Shelves: Consists of pivoting display shelves hinged to shelf brackets, which engage in slots in upright. Sloped display shelves are 14 actual height with a 1-5/16" flange at the bottom and boxed flanged upwards with inside safety hem. Included storage shelf is 12" deep nominal. Brackets allow for a slope of approximately 17 degrees from vertical. Each periodical shelf to have a minimum clearance of at least seven, (7) inches when display shelf is in upright position.

6. Finished Top:
   a. Bracket for Plastic Laminate Top: Inverted type bracket supports for canopy tops shall be formed of 12-gauge steel. Brackets shall have four (4) projections at the rear, two (2) hooks and one (1) safety lug, to engage the column slots and permit easy adjustment of top with maximum possible protection against dislodgment. Brackets shall be fastened to the top with zinc plated steel angles.
   b. Plastic Laminate Top: High pressure laminate surface on all exposed surfaces and edges, which covers a particle board core and produces an overall thickness of 1-1/4", as specified. Provide minimum 3mm thick PVC edge banding to match laminate.
      1) Plastic Laminate material per drawings.
   c. Finished Tops to be provided on shelves with tops at 42” and 48” AFF.

7. End Panel:
a. Plastic Laminate: High pressure laminate panel covering the entire height and depth of the unit and are universal. Laminate to be on all exposed surfaces covering a particle board core. Overall thickness of 3/4", core to have a density of not less than 45 lbs.
   1) High Pressure Decorative Laminate: NEM LD 3, Grade HGS or Grade HGL for flat countertops
      a) Manufacturers: Subject to compliance with requirements, provide products listed on the drawings as manufactured by the following:
         i. Formica Corporation
         ii. Lamin-Art, Inc.
         iii. Pionite
         iv. Wilsonart International Holdings, Inc.
   2) Edge Treatment: 3mm PVC edge banding to match laminate.

b. Steel End Panel with Plastic Laminate: Panels are formed from High pressure laminate panel on 18-gauge steel and covers the entire height and depth of the unit and are universal.
   1) Steel Panels are one-piece construction to create a flush profile with a 1-1/2" square edge and exposed return flange of no less than 3". Closure flanges at top produces tightly closed corners. Centers of double-faced panels are equipped with a full height channel (which is resistance-welded to panel) for use in securing panel to upright and for sound deadening.
      a) Paint Finish: Provide factory applied electrostatic powder coat paint, custom color to match sample provided by Architect
   2) High Pressure Decorative Laminate on 3/4" particleboard core to be attached to steel end panels with concealed fasteners. Configuration of panel as shown on drawings.
      a) Manufacturers: Subject to compliance with requirements, provide products listed on the drawings as manufactured by the following:
         i. Formica Corporation
         ii. Lamin-Art, Inc.
         iii. Pionite
         iv. Wilsonart International Holdings, Inc.
      b) Edge Treatment: 3mm PVC edge banding to match laminate.
   c. Wood End Panel – 3/4" thick wood end panel as indicated on drawings.
      1) English Oak Wood veneer
      2) Stain and finish to match Architect samples.
      3) Finish all sides to match face.

C. Wood Shelving
   1. Wood Box Framing
      a. Back panel: 1/4" thick back panel with veneer finish as selected by Architect from manufacturer’s standard.
      b. Sides to be constructed of 3/4" thick solid wood English Oak band. Sides to have holes drilled for shelf adjusters
   2. Base Shelves for wood shelves:
      a. Closed Base Shelves: formed from 3/4" thick veneered particleboard and banded on the exposed edges with 1/8" English Oak band to match face. Provide front base panel of 3/4" thick veneered particle board, 3-5/16" high.
   3. Adjustable Wood Shelves:
      a. Shelves to be constructed of 3/4" thick solid wood.
   4. Shelf Supports:
      a. Provide shelf supports or support peg per manufacturer standard. Each shelf to have a minimum of four (4) shelf supports, two on each side, to correspond to drilled side panels.

D. Accessories
   1. Book Supports for metal shelves: Findable, unattached, plate-type book supports, 9" high are made of 16-gauge steel with magnetic strip.
      a. Provide one (1) book support per new shelf
   2. Provide additional 14,000 book supports for use at existing shelves.
      a) Color to be selected by Architect to closely match existing.
      a. Provide one (1) book support per new shelf
   4. Shelf Filler: Formed from 18-20-gauge steel to dimensions as required. Each filler includes a tightly fitting cap.
   5. End Panel Signage: Clear Anodized Aluminum C-channel top and bottom frame in size as indicated on drawings with removable protective acrylic face for use with interchangeable owner provided inserts. Height of units to accommodate standard 8 1/2" letter paper in landscape orientation. Width of unit per drawings.
6. Shelving anchors: provide anchors for secure mounting to wall to prevent overturn of units. Coordinate location with General Contractor for provision of wall blocking where necessary.

2.3 METAL STORAGE CABINETS

A. Flat Files
1. Manufacturers
   a. Basis of Design: Products are based on cabinets provided by Steel Fixture Manufacturing Company and supplied / installed by H2I. Contingent on meeting all specification requirements, other approved manufacturers are:
      1) Spacesaver Corporation

2. Construction
   a. Structure: Cabinet front interior framework to be constructed of not less than 16-gauge steel formed into a channel shape around front of cabinet. Interior front framework consisting of top plate interior frame work of 16-gauge, upright interior frame work, and bottom plate of 16-gauge; shall be fusion welded at all four (4) corners for rigidity.
   b. Outer Cabinet: Sides shall be 20-gauge cold rolled steel, full height, front edge formed into a full height channel frame, 1-1/2” wide with a reinforcing flange.
   c. Back: 20-gauge cold rolled steel, shall be full height of cabinet, one piece, with all edges formed with a 7/8” flange. Back shall be spot welded to all sides, top, bottom and uprights at 8” intervals.
   d. Top: 18-gauge cold rolled steel, one piece with rear and side edge formed with a 1” flange. The front edge shall form into a full width channel frame 1” wide face with a reinforcing flange, reinforcement channel shall be welded to the inside of top; running full width. The top shall be spot welded to sides and back at 8” intervals.
   e. Bottom Plate: 20-gauge cold rolled steel, one piece. The front edge shall form into a full width channel frame 1” wide face with a reinforcing flange. A reinforcement channel shall be welded to the inside of bottom, running full width. The bottom shall be spot welded to sides and back at 8” intervals.
   f. Corners: All corners rounded, exposed edges shall be free of burrs.
   g. Toe Kick Base: constructed of 16-gauge steel. It has a 2-3/4” high face, followed by a 3/4” reinforcing flanges at the top and bottom. The base is a two-piece design that is splice at opposing, diagonal corners with a corner ell, spot welded. The base is a separate weldment bolted at the bottom of the finished unit(s). The toe kick base is nominally the same width of the flat tile cabinet, but not as deep by 3” to provide a toe area at the front of the flat file. Custom sizes are available upon request.

3. Drawers
   a. Construction: 16-gauge cold rolled steel on a two-piece rotary ball bearing suspension which extends the drawer hood flush with the front of the cabinet when opened. Each drawer is equipped with a rear hood, and upon request, a front compressor to alleviate document curling.
      1) Drawers must hold paper or equivalent density (100lbs) within the drawer dimensions, evenly distributed only.
   b. Hardware: The drawers shall be fitted with a brushed aluminum handle pulls and label holders. The label holder accommodates a 1-5/8” X 3-1/4” label. A push button, keyed lock is available upon request for locking all of the drawers with a single lock.
   c. Drawer Inside Clearance: 50” W x 39-11/16” D x 2-1/4” H
   d. Drawer Extension: 87%

4. Outside Cabinet Dimensions:
   a. 10 Drawer: 54-3/4” W x 41-3/8” D x 32-1/4” H
   b. Add 2-3/4” to height(s) when using a toe kick base on any model set up.

5. Material: All material used shall be the best adapted to the construction for which it is employed. Steel throughout is to be the best steel, cold rolled, full pickled, double annealed, stretcher leveled or equivalent, and free from scale. It shall be of the grade known as “furniture steel”. All gauges are to be U.S., standard, or heavier decimal gauges.

6. Finish: All materials in the cabinet are power washed, phosphatized, sealed and rinsed. Surfaces area finished with non-reactive solvent-free powder coating which is electrostatically applied and baked to a hard finish. It has no off-gassing of formaldehyde and organic acid as compared to the solvent base paints. Color selection by the Architect or Designer to match shelving

7. Guarantee: Defects in design, materials or workmanship that occur within seven (7) years of completion shall be remedied by the manufacturer at no expense to the owner.

B. Microfilm
1. Manufacturers
   a. Basis of Design: Products are based on cabinets provided by Steel Fixture Manufacturing Company and supplied / installed by H2I. Contingent on meeting all specification requirements, other approved manufacturers are:
      1) Spacesaver Corporation

2. Construction
a. Structure: Cabinet front interior framework to be constructed of not less than 16-gauge steel formed into a channel shape around front of cabinet. Interior front framework consisting of top plate interior frame work of 16-gauge, upright interior frame work, and bottom plate of 16-gauge; shall be fusion welded at all four (4) corners for rigidity.
b. Outer Cabinet: Sides shall be 20-gauge cold rolled steel, full height, front edge formed into a full height channel frame, 1-1/2” wide with a reinforcing flange.
c. Back: 20-gauge cold rolled steel, shall be full height of cabinet, one piece, with all edges formed with a 1” flange. Back shall be spot welded to all sides, top, bottom and uprights at 8” intervals.
d. Top: 20-gauge cold rolled steel, one piece with rear and side edge formed with a 1” flange. The front edge shall form into a full width channel frame 1” wide face with a reinforcing flange. A 20-gauge reinforcement channel shall be welded to the inside of top; running full width. The top shall be spot welded to sides and back at 8” intervals.
e. Bottom Plate: 18-gauge cold rolled steel, one piece. The front edge shall form into a full width channel frame 1-1/16” high face with a reinforcing flange. A reinforcement channel is welded to the inside of bottom at the front, rear, and center, running full width. The bottom shall be spot welded to sides and back at 8” intervals.
f. Corners: All corners rounded, exposed edges shall be free of burrs.
g. Leveling glides on all four corners which are adjustable from inside the cabinet (with lowest drawer removed). In lieu of levelers, casters or 6” legs may be installed if needed.

3. Drawers
a. Construction: 20-gauge cold rolled steel and are removable.
   1) Drawers are designed to hold loaded microfilms or equivalent density within the drawer’s inside dimensions, evenly distributed.
b. Hardware: The drawers shall be fitted with a single, centered handle pull. Full extension, heavy duty glides with ball bearing suspension. Drawers feature independent operation, anti-tip, safety interlock, allowing only one drawer to be used at a time. All drawers lock securely with a single, keyed lock, centrally located at the top of cabinet with a 180-degree rotation locking action.
   1) Each drawer is equipped with 6 partitioned rows sized for microfiche envelopes, which are equipped with removable, spring loaded compressors.
c. Drawer Inside Clearance: 34-1/16” W overall length x 28-7/16” D x 4-1/8” H
   1) Partition Height: 2-1/2”

4. Outside Cabinet Dimensions:
a. 12 Drawer: 39-1/2” W x 30” D x 55” H

5. Material: All steel material used is the best adapted to the construction for which it is employed. Steel throughout is to be the best steel, cold rolled, full pickled, double annealed, stretcher leveled or equivalent, and free from scale. It is of the grade known as "furniture steel". All gauges are to be U.S., standard, or heavier decimal gauges.

6. Finish: All materials in the cabinet are power washed, phosphatized, sealed and rinsed. Surfaces are finished with non-reactive solvent-free powder coating which is electrostatically applied and baked to a hard finish. It has no off-gassing of formaldehyde and organic acid as compared to the solvent base paints. Color selection by the Architect or Designer to match shelving

7. Guarantee: Defects in design, materials or workmanship that occur within seven (7) years of completion shall be remedied by the manufacturer at no expense to the owner.

C. Media Cabinets

1. Manufacturers
   a. Basis of Design: Products are based on cabinets provided by Russ Bassett Corporation as supplied / installed by H2I. Contingent on meeting all specification requirements, other approved manufacturers are:
      1) Spacesaver Corporation

2. Construction
   a. Structure: Cabinet front interior framework to be constructed of not less than 16-gauge steel formed into a channel shape around front of cabinet. Interior front framework consisting of top plate interior frame work of 16-gauge, upright interior frame work, and bottom plate of 16-gauge; shall be fusion welded at all four (4) corners for rigidity.
b. Outer Cabinet: Sides shall be 20-gauge cold rolled steel, full height, front edge formed into a full height channel frame, 1-1/2” wide with a reinforcing flange.
c. Back: 20-gauge cold rolled steel, shall be full height of cabinet, one piece, with all edges formed with a 7/8” flange. Back shall be spot welded to all sides, top, bottom and uprights at 8” intervals.
d. Top: 18-gauge cold rolled steel, one piece with rear and side edge formed with a 1” flange. The front edge shall form into a full width channel frame 1” wide face with a reinforcing flange, reinforcement channel shall be welded to the inside of top; running full width. The top shall be spot welded to sides and back at 8” intervals.
3. Media Drawers
   a. Construction: 16-gauge cold rolled steel on a two-piece rotary ball bearing suspension which extends the
drawer hood flush with the front of the cabinet when opened. Each drawer is equipped with a rear hood,
   and upon request, a front compressor to alleviate document curling.
   b. Hardware: Heavy duty, ball bearing slides provide smooth movement and full access to the drawer interior.
      Full width pulls and integrated label holder. Drawers feature independent operation, anti-tip, safety
      interlock, allowing only one drawer to be used at a time. Optional turn-key locks provide security and
      access control.
      1) Dividers: Wire dividers or equal that can be repositioned and adjusted for width. Provide 5 dividers
         per drawer.
   c. Drawer Inside Height: 6” H
   d. Anticipated Capacity:
      1) CDs: 2,400
      2) DVDs: 1,120

4. Outside Cabinet Dimensions:
   a. 8 Drawer: 36” W x 24” D x 56” H

5. Material: All material used shall be the best adapted to the construction for which it is employed. Steel
   throughout is to be the best steel, cold rolled, full pickled, double annealed, stretcher leveled or equivalent,
   and free from scale. It shall be of the grade known as “furniture steel”. All gauges are to be U.S., standard, or
   heavier decimal gauges.

6. Finish: All materials in the cabinet are power washed, phosphatized, sealed and rinsed. Surfaces area
   finished with non-reactive solvent-free powder coating which is electrostatically applied and baked to a hard
   finish. It has no off-gassing of formaldehyde and organic acid as compared to the solvent base paints. Color
   selection by the Architect or Designer to match shelving

7. Guarantee: Defects in design, materials or workmanship that occur within seven (7) years of completion shall
   be remedied by the manufacturer at no expense to the owner.

D. End Panel:
   1. Steel End Panel with Plastic Laminate: Panels are formed from High pressure laminate panel on 18-gauge
      steel and covers the entire height and depth of the unit and are universal.
      a. Steel Panels are one-piece construction to create a flush profile with a 1-1/2” square edge and
         exposed return flange of no less than 3”. Closure flanges at top produces tightly closed corners.
         Centers of double-faced panels are equipped with a full height channel (which is resistance-welded to
         panel) for use in securing panel to upright and for sound deadening.
         Paint Finish: Provide factory applied electrostatic powder coat paint Color selection by the
         Architect or Designer to match shelving
      b. High Pressure Decorative Laminate on 3/4” particleboard core to be attached to steel end panels with
         concealed fasteners. Configuration of panel as shown on drawings.
         1) Manufacturers: Subject to compliance with requirements, provide products listed on the drawings
            as manufactured by the following:
            v. Formica Corporation
            vi. Lamin-Art, Inc.
            vii. Pionite
            viii. Wilsonart International Holdings, Inc.
         2) Edge Treatment: 3mm PVC edge banding to match laminate.

E. Finished Top:
   1. Plastic Laminate Top: High pressure laminate surface on all exposed surfaces and edges, which covers a
      particle board core and produces an overall thickness of 1-1/4”, as specified. Provide minimum 3mm thick
      PVC edge banding to match laminate.
      1) Plastic Laminate material per drawings.
   2. Secure Finished Tops to End Panels so that top and sides are tight to cabinets. Combine adjacent
      cabinets under shared top.
   3. Finished Tops to be provided on cabinets with tops at or below 48” AFF.

2.4 ANCHORS
A. Floor Anchors: Galvanized-steel provide number per unit recommended by manufacturer unless additional
   anchors are indicated in calculations.
B. Wall Anchors: Manufacturer's standard, galvanized-steel anchors designed to secure metal storage shelving to adjacent wall. Provide one per shelving unit for each shelving unit adjacent to a wall unless additional anchors are indicated in calculations.

2.5 FABRICATION
A. Fabricate metal storage shelving components to provide field-assembled units that are square and rigid, with posts plumb and true and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.
   1. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
   2. Build in straps, plates, brackets, and other reinforcements as needed to support shelf loading.
   3. Cut, reinforce, drill, and tap metal fabrications to receive hardware, fasteners, and similar items.
B. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work. Form backs of shelving units of up to 48 inches (1219 mm) wide from one piece.
C. Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a hem on the concealed side; ease edges of metal plate to radius of approximately 1/32 inch (0.8 mm). Shear and punch metals cleanly and accurately. Remove burrs.
D. Weld corners and seams continuously to develop strength, minimize distortion, and maintain the corrosion resistance of base metals. At exposed locations, finish welds and surfaces smooth and blended so surface is smooth after finishing and contour of welded surface matches that of adjacent surface. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces before finishing.

2.6 FINISH MATERIAL AND WORKMANSHIP SPECIFICATIONS
A. Metal Shelving, Supports, and Panels unless otherwise indicated.
   1. The shelving is made from only the finest materials and workmanship. All sheet metal is commercial quality furniture stock steel, hot & cold rolled, reannealed, fully pickled or equivalent. All gauge thicknesses conform to U.S. standards.
   2. Shall be an epoxy powder applied electrostatically. The finish yields a minimum average thickness of 1.0 to 1.8 mils and has a medium gloss. Abrasion resistance requires a minimum of 60 liters of sand to remove finish to bare metal, as determined by Library Technology test guidelines.
   3. Color to be white as from manufacturer’s color line, as selected by Architect.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine floors for suitable conditions where metal storage shelving will be installed.
C. Examine walls and ceilings to which metal storage shelving will be attached for properly located blocking, grounds, or other solid backing for attachment of support fasteners.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Vacuum and clean finished floor over which metal storage shelving is to be installed.

3.3 INSTALLATION
A. Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.
   1. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
   2. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.
   3. Adjust post-base bolt leveler to achieve level and plumb installation.
   4. Anchor shelving units to floor with floor anchors through floor plate. Shim floor plate to achieve level and plumb installation.
   5. Install seismic restraints.
   6. Connect side-to-side and back-to-back shelving units together.
   7. Install shelves in each shelving unit at spacing indicated on Drawings.
      a. Metal Cantilever Shelves: Install shelves so that hooks are fully engaged and locked into frame.
      b. Wood Shelves: Install adjustable shelf clips at front and back of each shelf.
B. Accessories:
   1. Install finished end panels and trim at exposed ends of all shelving units unless noted otherwise, typical.
2. Shelf Dividers: Install at locations indicated on Drawings.

3.4 ERECTION TOLERANCES
   A. Erect metal storage shelving to a maximum tolerance from vertical of 1/2 inch (13 mm) in up to 10 feet (3 m) of height, not exceeding 1 inch (25 mm) for heights taller than 10 feet (3 m).
   B. Erect post-and-beam metal storage shelving to a maximum tolerance from vertical of 1/4 inch (6 mm) in 84 inches (2134 mm) of height.

3.5 ADJUSTING
   A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.
   B. Adjust and lubricate operable components to operate smoothly and easily, without binding or warping. Check and readjust operating hardware.
   C. Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.
   D. Replace metal storage shelving components that have been damaged beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 105613
SECTION 105626 - MOBILE STORAGE SHELVING

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. High-density mobile storage units mounted on powered carriage, support rails, fabrication and installation including leveling of support rails.
2. Verification of floor levelness and provisions for leveling all systems.
3. Verification of height of systems to allow minimum 18 inch clearance above top of units to fire suppression system sprinklers consistent with NFPA13 requirements. Coordinate with General Contractor.
   a. Provide shelving units which comply with this requirement. Height of shelving units may vary from that shown on the drawings or indicated herein in order to comply with this requirement.
4. Verification of power requirements and coordination with General Contractor. Final layout of system install locations and coordination with General Contractor for systems and floor finish installation. Coordinate interface to the building’s fire alarm system, lighting system, power generator or building management system for security and fire protection with the General Contractor.

B. Related Work, Not Furnished:
1. Structural floor system capable of supporting live and dead loads required by prevailing building codes, including loads of storage units to be installed. Provide a maximum allowable sub floor deflection of under specified mobile 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. Power wiring to units from adequate power supply. Final connections to units shall be provided by installer.
4. Fire suppression system is by others.

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 mobile carriages and shelving capable of withstanding the effects of earthquake motions as determined according to IBC 2006 and local building codes.
C. Design Requirements: All mobile carriage and shelving elevations as per attached drawings and described in specifications.
D. All system components are to be finished in the same matching colors. This may necessitate some components to be custom colors. The color of metal shelving as selected by the Architect will govern.
E. Color Samples: Provide sample for each exposed product and for each color required.
F. 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.
G. Installer Qualifications: Hire 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.
H. Warranty: Submit a written warranty, executed by the 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.
   10-YEAR LIMITED WARRANTY: for ten (10) years from the date written hereafter*, for all carriage drive motors. During the 10-year warranty period, all parts are included at no cost for 10 years. Labor installation is included at no cost during the first year of the 10-year warranty period.
5-YEAR LIMITED WARRANTY: for five (5) years from the date written hereafter*, for all equipment, other than structural frames, carriage drive motors, new electronic components installed for an electrical upgrade of systems, light fittings and these electronic components: emergency power system (UPS), routers and WIFI remote controls. 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.

3-YEAR LIMITED WARRANTY: for three (3) years from the date written hereafter*, for all new electronic components installed for an electrical upgrade of systems (logic board, control and distance sensor), other than light fittings and these electronic components: emergency power system (UPS), routers and WIFI remote controls. During the 3-year warranty period, all parts are included at no cost for 3 years. Labor installation is included at no cost during the first year of the 3-year warranty period.

1-YEAR LIMITED WARRANTY: for one (1) year from the date written hereafter*, for light fittings and these electronic components: emergency power system (UPS), routers and WIFI remote controls. During the 1-year warranty period, all parts and labor installation are included at no cost for 1 year.

* 10-year limited warranty, 5-year limited warranty, 3-year limited warranty, and 1-year limited warranty are applicable from the date of warranty registration completed by the end-user. As indicated on the registration form, registration constitutes the customer's written acceptance of installation. If registration has not been activated by the end-user within sixty (60) days from date of factory shipping, the warranty shall be in force from the date of shipping.

I. 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.
   1. Coordinate schedule with General Contractor to ensure completion of work.

J. Manufacturer Qualifications:
   2. ISO 14001:2015: Engage an experienced manufacturer who is ISO 14001:2015 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 14001:2015 registration certificate, certifying the environmental performance of manufacturer.
   3. Underwriters Laboratories Inc.: Powered mobile system shall be C-UL US listed certified. Manufacturer shall submit C-UL US certification with proposal.

1.4 SUBMITTALS
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 mobile carriages and storage shelving, 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: Providing separate written certifications by manufacturer on manufacturer’s letterhead at time of bid is required stating compliance with all specifications of shelving systems. Shelving certifications must confirm compliance with all shelf sizes and gauges as noted in these specifications. If bidding different manufacturers for mobile and shelving, two (2) certifications are required.

1.6 PROJECT CONDITIONS
A. Field Measurements: Verify mobile carriages and shelving 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 mobile carriage and shelving units 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 mobile carriage and storage shelving 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.
d. General Contractor and relevant sub-contractors.
e. Manufacturer’s representative.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. General: Products are based on mobile shelving system products manufactured by Montel as supplied / installed
by H2I or Spacesaver. Contingent on meeting all specification requirements.

2.2 BASIC MATERIALS
A. Grout:
1. General: The compound shall be cementitious grout 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:
   a. Age:1 hour - 4,500 PSI
   b. 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 – MOBILE
A. Tracks:
1. Rails shall be designed and manufactured to carry loads of 1,000 pounds per linear foot (1,488kg/m) of carriage.
   Made of minimum cold rolled steel (CRS) rail assembly of 1/4" (19mm) high x 1" (25mm) wide inserted in a
   surface treated aluminum sub-rail. Rail contact surface shall be minimum 1" (25mm) wide. The inserted steel
   rail shall be replaceable.
2. Sub-rails shall be leveled with self-leveling screws above or below the walking surface. Shims shall not be
   accepted.
3. Sub-rails shall be designed to be anchored on top of structural concrete floor and to allow for adjustment so
   sub-rails can be leveled over an uneven floor.
4. 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 3/8" (19mm) deep.
5. 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.
6. 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.
7. Rail shall be located and positioned properly, leveled and grouted, allowing at least 3/8" (9.5mm) 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.
8. 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.

9. Rails are 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.

10. 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

11. Built-in anti-tip device sub-rail shall be provided to meet local building code and high height-to-width ratio.

B. Floor/Ramp:

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 in compliance with ADA requirements. The vertical transition from the ramp edge to the floor shall be a maximum of 1/8".
   c. Ramps shall extend under all movable and stationary ranges except as noted differently. Ramps shall be made of 12-gauge steel. Floor panels shall be constructed of a minimum 5/8" underlayment grade plywood. Floor panels must be provided between all rails the full-width of systems, except under stationary platforms.
   d. The floor and ramp shall be constructed in a manner preventing any warping or deformation of the floor panels in a normal operating environment.
   e. Floor covering is to be installed and supplied by others.
      1) Coordinate installation of underlayment with Owner’s General contractor.
   f. Floor panels shall be provided with built-in floor anchor to provide a continuous leveled floor surface.
   g. The floor covering face sections, one per aisle assembly. Support sections shall be embossed to eliminate the need of filler plates between the shelving cabinet and the C shape supports.
   h. Stationary carriages, as shown on the drawings, shall be of same construction and height as the mobile carriages and anchored to rails. Setting of shelving on floor at ends of mobile runs is unacceptable.
   i. Necessary carriage splices shall be bolted type designed to maintain proper unit alignment and weight load distribution.
   j. Carriage face sections shall provide a smooth, clean appearance without any assembly holes or protruding hardware.
   k. Carriage straightness shall have no more than 1/2" (6.35mm) maximum deviation from a true straight line. There shall be no permanent set or slippage in any spliced or welded joint when exposed to forces encountered in normal operating circumstances.
   l. Carriage construction shall be designed to allow the shelving uprights to be secured to the carriage frame with two assembly kits per upright of vibration-proof graded 5" bolt, nut, and clamp anchor assemblies and so that there is no visible hardware on carriage face. Recess design carriages are not permitted. Self-drilling screw attachment is not acceptable method of attachment shelving units to the carriage. No shelving or cabinet attachment hardware shall be visible on exterior face of carriages.
   m. Each carriage shall have at least two wheels per rail.
   n. Carriages shall have powder coat (1.5 mil) finish on all surfaces. Color selection by the Architect or Designer to match shelving. Powder coat paint finish is required for finish durability and elimination of any off gassing. Finish shall be inert, with no volatiles present in finished product. Visible galvanized steel structural carriage components are unacceptable.

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 1 5/16" (33mm) outside diameter by maximum 1 1/8" (29mm) inside diameter. Solid steel rod is not acceptable.
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. Module shall operate on 115 Volts 50/60 Hertz, 15 or 30 Amp dedicated circuit, depending on the quantity of carriages.
E. Wheels:
   1. Wheels shall be constructed of solid minimum 1045 cold rolled steel (CRS) for smooth operation. Minimum load capacity per wheel 3,200 pounds (1,452kg) Wheels shall be precision ground, balanced. All bearings shall be permanently shielded and lubricated.
   2. All wheels shall be minimum 5” (127mm) diameter (outside dimension). They shall be dual- flanged and sloped to insure efficient guidance. Single center flanged wheels are not acceptable.
   3. Due to carriage length and shelving/racking heights, guide wheels shall be at all wheel locations.

F. For Stacks system - Motors:
   1. Each carriage shall be equipped with a minimum of one (1) 90 VDC current limited, fractional horsepower gear motor.
   2. Gear motor shall be connected to a full-length shaft at all rail locations to avoid potential distortion.

G. For ITAC Mechanical Assist System 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 1 5/16” (33mm) outside diameter by maximum 1 1/8” (29mm) inside diameter. Solid steel rod is not acceptable.
   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” (9mm) between sub-rail and rail sections to reduce tripping hazards, allow carts to easily roll over, prevent debris accumulation, and facilitate cleaning.

H. Face Panels:
   1. Stacks system shall be Plastic Laminate over Steel end panel
      a. Wood or laminate End Panels: The panel thickness shall be 11/16” (17.5mm) and it shall be installed over a regular metal face panel. It shall be constituted from a 5/8” (16mm) particleboard complying with ANSI A208.1 Grade M-2, and made of at least 90% of recycled wood fiber, covered on both sides with a colored laminate grade 10/HGS. Edges shall be finished with a color matching edge banding.
   2. Materials: All exposed face panels shall be steel with a plastic laminate wrapped wood face. Face panels shall be located on all operating ends of ranges as shown on drawings.
   3. Finishes: Selected from manufacturer’s standard available colors and patterns. Selected by the Architect or Designer.
   4. Face panels must cover the full height and width of shelving.

I. Control Boards:
   1. Control boards shall offer capability to be upgraded with new generations of software.
   2. TCP/IP protocol connectivity shall be provided with control boards.

J. Movement Controls:
   1. Simple LCD Controls Access Control: Provide a Simple Control with LCD display on the accessible (open) end of each mobile carriage.
      a. Simple Controls with LCD Display shall include two arrow shaped OPEN backlit buttons, and a STOP backlit button. Provide a 32-character display for mobiles status and additional safety. Display shall be permanently backlit. The multilingual LCD display messages shall be available in at least 3 languages (English, Spanish, French).
   2. Each carriage shall have a control centered on each face panel and located at 41” (1041mm) (from the base of the carriage to the base of the control).
   3. All controls and indicator lights shall be solid state and shall provide visual indication of safety module operation. Controls shall offer illuminated feature on the stop and the arrow buttons for additional feedback to the user and allow easy visual status from across the room. Only the safe and available operational functional shall be the illuminated functional options for the user. Controls shall feature a module error backlit indicator light in case of any abnormality.
   4. The control’s housing shall be impact-resistant
   5. Sealed membrane control technology to ensure maximum life duration of controls. Mechanical push button controls or membrane activating mechanical push button controls are not acceptable. Membrane controls shall be sealed for water and dust penetration, as well as chemical-resistant.
   6. Automatic Aisle Reset: Upon confirmation there are no users or objects in the aisle, the module shall reset automatically and the LED-friendly backlit arrows on the control panel shall display a constant blue indicating the available aisle. Systems requiring manual reset shall not be acceptable.
   7. Infrared Distance Measuring Sensors: Provide each aisle with a distance sensor programmable with the PIN-code controls main menu. Distance measuring sensors shall be provided to easily adjust aisle spacing between closed carriages and adjust individual carriages to provide necessary clearance to accommodate and protect objects that are overhanging the shelves. Mechanical plungers are not acceptable, as well as manual adjustment of proximity sensors or the necessity of a computer connected to a control board to adjust aisle spacing.
K. **Safety Features:**
1. **Safety Lock Out:** Red STOP indicator shall signal occupation on each side of the aisle and prevent selection of a new aisle until open aisle is cleared. LED-friendly visual directional arrows shall provide verification that carriages are in locked or unlocked mode, and display only the safe available choices for carriage movement.
2. **Dual sided Low Safety Activation Height:** Safety system shall detect objects as small as 1-1/2" high located anywhere in the aisle. Safety device on both sides of the carriage side members shall not be mounted higher than 1-1/2".
3. **Fail-Safe Technology:** Safety system shall be fail-safe design and prevent any carriage movement should the system fail.
4. **Electronic Overload Protection:** Shall shut off power to the motor when excessive pressure is applied against a carriage. Pressure sensitivity shall be programmable and adjustable with Remote Monitoring Software.
5. **Dual sided Aisle-Entry People Counter:** Shall monitor users entering and exiting an aisle.
6. **Remote System Monitoring Software:** Provide PC-based diagnostic system for monitoring and configuring all mobile system’s safety, power, and functionality processes. Monitoring system shall automatically notify specified service personnel of abnormalities with system operation or safety systems.

L. **Security Features:**
1. **Building Interface:** Provide the powered mobile to interface with the building’s fire alarm system, lighting system, power generator or building management system for security and fire protection.

M. **Carriages Movement:**
1. Each carriage shall provide controlled acceleration and deceleration to protect stored books or objects. Each motor shall have a dynamic braking system that will stop the carriage whenever a safety feature is activated.
2. Controls shall provide movement with a controlled running speed of 3" (76 mm) per second. Speed parameters for gentle start-up, cruising speed, and braking movements shall be programmable with the Remote Monitoring Software.
3. Module movement shall start carriages by block to move all carriages at once. Capability to change easily from Sequential Movement to Block Movement with the Remote Monitoring Software. Module movement must not require any modification to the module configuration and without the use of an external device such as a computer.
4. **Multi-Tasking Aisles:** Carriages movement shall be initiated while other carriages are already moving and completing their move cycle.
5. **Keyless Override Mode:** Carriage movement shall move one at a time with reduced speed using a 4-digit PIN code. Systems requiring a key to override the system are not permitted.

N. **For Stacks system only - Auxiliary Override:**
1. **Automatic Built-In Battery Backup:** Powered mobile system shall be always operational even during power failures. Provide one battery backup per module. Battery must always be recharging. All preprogrammed functionalities, safeties, and speed shall remain operational.
2. **Mechanical Ratchet Backup:** Each carriage shall be equipped with a mechanical ratchet device connected directly to the full-length drive shaft to ensure complete accessibility in case of primary power failure, no operational downtime, simplified system installation, and easy relocation. Provide a mechanical ratchet tool to operate each carriage manually. Ratchet tool shall be easily connected to the mechanical ratchet device without removing the face panel. Removable plastic-molded cap shall be installed at each bottom right corner of each face panel.

O. **ITAC Mechanical Assist 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. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
2. Operating handles shall be three-spoke type (single spoke handle are unacceptable) of 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 be mounted at 39 1/2" from bottom of the carriage.

P. **ITAC Safety Features:**
1. **Aisle Safety Push Button Lock (for single access):** Shall be located at the center of the handle. The user shall press the aisle safety push-button, which will lock the respective carriage. After being pressed, the aisle safety push-button shall protrude from the handle face to display a red band visible to users. After being re-pressed, the aisle safety push-button shall return to its unlocked state. Pull-out pins are unacceptable. Both carriages on either side of the aisle must be secured.
2. Toe-Level Safety Sweep (for single or dual access): Consisting of hinged aluminum safety bar running full length of the mobile carriages, flush with bottom of carriage frame and on both sides of carriage. Upon activation of the sweep, an internal device shall interlock with drive train resulting in positive stop anywhere in the module. A one and half (1.5) pound pressure applied on the safety bar will activate the safety. The safety shall automatically reset upon removal of the obstruction or if carriage is backed away from the obstruction. This active safety shall not require any electricity or battery to be activated (mandatory).]

Q. Accessories:
1. Dual Controls: Provide additional control panel at end of each powered or mechanical assist carriage for accessing from either end of the aisles.
2. End Panel Signage: Clear Anodized Aluminum C-channel top and bottom frame in size as indicated on drawings with removable protective acrylic face for use with interchangeable owner provided inserts. Height of units to accommodate standard 8 ½” letter paper in landscape orientation. Width of unit per drawings.

2.4 MANUFACTURED COMPONENTS – CANTILEVER SHELVING FOR STACKS MOBILE SHELVING
A. Shelving on Mobile System – please see drawings for layout and use elevations for number of adjustable shelves per section.
   1. Welded Frame Upright:
      a. Formed of 14-gauge steel into a channel shape with 3/4" stiffening flanges on the inside of the upright, the channel to measure 2" in the web and 1 1/4" across the front and rear faces. They present a smooth, closed box shape in cross section with either right angle bends when bolted to the adjoining column of the next unit or bolted to an end cover. When bolted to adjacent welded frames, exposed open channels of uprights are unacceptable. Each column is perforated full-height on both faces with a row of slots spaced 1” on vertical centers and located within 5/16” of the outer web surface. Every fifth and sixth slot has square corners as viewed against the remaining rounded corner slots to aid visual alignment of shelves. This pattern is repeated over the full height of the upright.
      b. Top Spreader Tube: Formed of not less than 14-gauge tubular steel measuring 1” x 3” in cross section. The spreader is electrically welded to the uprights.
      c. Bottom Spreader: Formed, channel shape measuring 1” x 1-3/4” in cross section and consists of not less than 16-gauge steel. The outer ends of the channel are punched to receive leveling nuts and floor levelers. The bottom channel is electrically welded to the uprights with the open face of the channel positioned upward. Weld Frames heights are as specified, widths are 36” standard. Weld frames are equipped with two (2) adjustable floor levelers.
   d. Non-welded frame cantilever type shelving units are unacceptable.
2. Base Support Brackets:
   a. Closed Base Brackets: Designed to fit snugly in and around the welded frame upright. Material is no less than 16-gauge steel. Brackets have a 90-degree flange at the bottom to rest on the floor covering. Hardware for leveling the book stack is included. Top and front edge of the base bracket are flanged outward approximately 1/4”. The profile of the bracket matches that of the adjustable shelf end bracket. The embossed area incorporates a hole to allow attaching of adjoining base brackets with a fastener.
3. Shelf End Brackets:
   a. Formed of not less than 16-gauge steel; with all but the rear edge flared outward approximately 1/4”. The rear edge has two crimped hooks at the top for engaging frame upright slots, and a positioning tab at the bottom to prevent accidental dislodgement. The bracket incorporates two lances with protruding dimples in the sides for securing shelf side flanges. Bracket design allow for shelf adjustment upward and downward (i.e. “walking the shelf”) without disturbing any of the other shelves. Bracket emboss prevents overlapping of adjoining brackets. Brackets extend at least 6” above the shelf surface.
   b. Closed Base Shelves for Shelves on Mobile Unit:
      a. Closed Base Shelves: formed from not less than 18-gauge steel into a one piece construction designed to fit snugly around base brackets without the need for fasteners. Front height is 3-5/16”, and sides have stiffening flanges.
      b. Closed Base Shelves, single face and double face
B. Accessories
   1. Book Supports: Findable, unattached, plate-type book supports of 9” high are made of 16-gauge steel with magnetic strip.
      a. Provide one (1) book support per new shelf

2.5 MANUFACTURED COMPONENTS – 4-POST SHELVING FOR ITAC MOBILE SHELVING
A. Shelving on Mobile System – please see drawings for layout and use elevations for number of adjustable shelves per section.

1. Upright Frames: Upright frames are made of two or more cross members welded to the top and bottom (and center if necessary) of the post and forming a rectangular upright frame. Each post shall be made of 16-gauge 1 ¼” x 1 ½” rectangular shaped cold rolled steel. The lateral sides of the posts are slotted at every one inch increment. The slots are 3/16” wide x 5/8” long and are designed to accommodate a variety of shelf and roll-out drawer configurations. The back of the post is also slotted at every 1 ½” increment with two rows of slots side by side from top to bottom. They are 3/16” wide x 5/8” long with 3/8” between the two rows. The uprights must allow for component integration on either 1” or 1 ½” increment depending only on the selected shelf component. Due to aesthetic concerns, user’s performance requirements, safety of users and stored materials, and to provide maximum flexibility, “L & T 4-Post” utility shelving system styles are unacceptable.

2. Cross Members: Cross members are 4” high x ½” wide. They are made of 16-gauge steel folded to create a “U” shape channel. At both ends, hook type design allows to snap the cross members in both rows of slots at the same time. The cross members shall be welded to the post. Non-welded frames must be available to minimize shipping volume, thus reducing truck pollution.

3. Levelers: Each post shall have an integrated leveler, inserted into formed upright tube, which allows for ¾” adjustment to accommodate for uneven floor surface. No temporary shims or other third party leveling device will be accepted.

4. Supported type:
   a. Full-depth shelves: Full-depth shelves are made of box rolled formed 18-gauge steel, with “Four Bend” ¾” edge construction which adds additional strength and capacity as well as it creates a hidden safety edge to protect people and items. The full-depth shelves are supported by two longitudinal shelf supports and the appropriate number reinforcement channels.
   b. Longitudinal supports: 1 ¼” high supports for heavy duty application are made of one “U” shaped 12-gauge steel channel. A standard formed steel claw is welded at each end to form a complete support. These supports are inserted into the slots located at the back of the post.
   c. Front-to-back reinforcement channels: 1 ¼” high reinforcement channels for heavy duty application are made of 12-gauge steel formed in a “U” shaped channel and are sitting on the longitudinal shelf supports.
   d. Base support: A 12-gauge steel special “U” shaped channel is provided for the bottom shelf. The support is inserted at the bottom of each post and anchored to the floor or to the carriage, in compliance with seismic standards.
   e. Maximum deflection under load; must maintain L/140 based on a uniform distributed load of 50 pounds per square foot.

5. End Panels: Shall be constructed of 18 gauge steel, 2” thick, they are bolted to bottom and top upright cross members.

6. Side and / or Back Closure Panels: Shall be constructed of 18-gauge steel, they are formed to be flush with the edge of the shelving upright and bolted to bottom and top upright cross members.
   1) Shall allow for secure locking of system.

7. Slotted Center Stops (double entry): Shall be 4 3/1” high formed of 20-gauge steel with two offset bends. Slots are located on 1” increments for divider adjustment.

8. Locking: provide keyed locking of system.

2.6 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 9001:2015 quality standards. All steel shall be superior quality milled, cold rolled, pickled, and double annealed, free from scale and buckle. 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 steel components shall be painted with an electrostatically applied powder coat finish. All steel parts shall be machined smoothed and thoroughly cleaned by a process of completely washing in a phosphatizing solution to insure removal of oil, grease or other foreign material which could interfere with the adhesion of the priming coat in any way. 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 35 to 65 degrees on a standard gloss meter and must be capable of withstanding severe hammer and bending tests without flaking. The finish for epoxy-polyester hybrid powder coat shall be a minimum 1.2 mil thickness capable of resisting methyl ethyl ketone, 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 Architect.
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