SECTION 116100

REDUCTION CURTAIN SYSTEMS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Work under this Contract includes all installation labor, materials, tools, transportation services, supervision, coordination, taxes, permitting fees, etc., necessary to complete the installation of the Reduction Curtain System, as described in these specifications and illustrated on the associated drawings. The systems shall be called the "Reduction Curtain System" and the installer the "Contractor".

B. The work specified herein is performance based. This requires the Contractor to provide all subsequent design and engineering, which is not included within the Contract Documents, to meet the requirements of this Performance Specification. The Contractor is responsible for providing all components necessary for complete and operational system. Any system changes or revisions necessary to make the system conform to the building, walls, steel, electrical services etc., shall be included at time of proposal and installed without claims for additional compensation.

C. The drawing included with this specification conveys a general plan layout of the Curtain. The plan does not show complete and accurate building details. The Contractor is responsible for making field measurements necessary to establish exact locations, relationships, load capacities including structural, mechanical and electrical necessary for the installation of these systems.

D. The Coliseum Reduction Curtain System includes the following major item:

1. An upper-seating bowl curtain reduction system (as shown on Figure 1) to partition the facility's upper seating area when not required for smaller-scale events,

E. The Contract also includes:

1. Development of final design drawings. Submission to the County for approval.
2. Submission of all information required by public agencies.
3. State of Wisconsin Registered Engineers' stamp/certification on structural and electrical drawings and calculations as required.
4. Verification of dimensions and conditions at the job site.
5. Preparation of submittal information.
6. Installation in accordance with the contract documents, manufacturer's recommendations, and all applicable code requirements.
7. Initial tests and adjustments, written report, and documentation.
8. Instruction of operating system for County & provision of manuals.
9. Creation and documentation of structural loading guidelines and procedures for use by the County in suspending temporary additional loads from the system.
10. Maintenance services; warranty.

1.2 DESCRIPTION OF WORK

A. Upper-Concourse Reduction Curtain and Rigging

1. Provide a custom rigging and curtain system as located on the drawings.
2. System shall consist of:

    a. Multiple curtain panels suspended near the facility' super-structure and rigged to draw up tightly to same when not deployed. Curtains shall fall along the upper seating bowl area as described on the drawings.
    b. Integrated motorized truss/hoisting system mounted at overhead structure to support the reduction curtain. Truss shall contain all the mechanized components and the necessary rigging required to gather curtain upward.
    c. All supplemental structural components necessary to support the curtains and hoisting equipment. All rigging and structural components shall be reviewed and certified for the intended us by a Professional Engineer licensed to practice in the State of Wisconsin.
    d. Operating controls, motor control panels and electrical equipment as necessary to raise and lower the curtain panels. Primary operator controls shall be a wireless handheld pendant for use from the seating bowl or the Coliseum floor. Control cabinets and secondary controls shall be installed at the Coliseum catwalk level.
    e. Curtain shall be custom fabricated to provide the flexibility and durability necessary for the intended raise/lower cycling. Curtain shall be Black or will be selected from the manufacturer's standard color range by the County.

B. Arena Floor Reduction Curtain

1. Provide a curtain system to temporarily segment/partition the arena upper concourse as required for concerts and similar performance events. The primary orientation for the curtains shall be across the arena floor to visually separate the upper concourse during events held on the floor.
2. The quantity of curtain and supporting rigging equipment shall be sufficient to cross the arena event level and upward across the seating bank to the concourse level as described on the drawings. While multiple key locations for the installation of the curtain system are described on the drawings, only a single line of curtain is required. It is assumed that the County / AEC staff will elect to implement a variety of curtain configurations utilizing all or a part of the inventory to be provided.
3. The Reduction Curtain system shall consist of:

    a. Multiple curtain panels fabricated of inherently flame-retardant black PD cloth. Curtain Panels shall be affixed to their supporting truss using Velcro-type (hook and loop) ties for easy installation and removal.
    b. A hoisting and truss system consisting of

        1) Lengths of standard entertainment industry alloy truss.
        2) A suitable inventory of hinged connector segments and corner blocks to enable ease of installation and maximum flexibility.
        3) Portable chain-hoist motors, associated, hardware, controls and cabling to support, raise and lower the curtain.
        4) All hoisting equipment shall mount to the structure located above the Coliseum floor. All power for hoisting motors shall be derived from the catwalk power system within the Coliseum.

1.3 RESPONSIBILITY AND RELATED WORK

A. Power will be provided by the County as part of the general contract. The Contractor shall be responsible for termination and distribution electrical power from the panel to the equipment as required (including load center, breakers, step down transformers, etc.). This will include necessary distribution boards, conduit and cabling as required for a complete installation.

1. The Contractor shall be responsible for termination and distribution of electrical power from the demarcation to the equipment as required (including load center, breakers, step down transformers, etc.). This will include necessary distribution boards, conduit and cabling as required for a complete installation of all equipment in accordance with NEC code, local & state codes and industry standards.

B. Supply accessories and minor equipment items needed for a complete system.

C. It is the responsibility of the Contractor to supply systems in full working order.

D. Obtain all permits necessary for the execution of any Work pertaining to the installation. Costs for permits shall be borne by the Contractor.

E. If a conflict develops between these documents and specifications and the appropriate codes and is reported to the County prior to proposal submission, the County will prepare the necessary clarification. Where a conflict is reported after contract award, propose a resolution of the conflict and, upon approval, perform work.

F. Contractor is responsible for touch up and repair of welds, paint and finishes where work attaches to existing structure. Coordinate with County to maintain all product warranties where attaching to other trades such as Paint, Expansion Joints, etc.

G. Coordinate work with Alliant Energy Center staff (County) to avoid conflict with scheduled events.

1.4 QUALITY ASSURANCE

A. Reduction Curtain System Provider Qualifications: Firm experienced in the installation of systems similar in complexity to those required for this project; and meet the following requirements. Proposals will be rejected as unresponsive should the following information not be provided with proposal.

1. At least three years experience with equipment and systems of the specified types.
2. Experience with comparable scale projects.
3. Suitable financial status (i.e.; bonding and materials purchase capacity) to meet the obligations of the work.
4. With the bid, the potential Contractor shall provide documentation that they have:

a. Form of corporation.
b. Adequate capacity to complete the work on schedule.
c. Adequate regional service organization to meet warranty response requirements for the project.
d. Suitable financial status (i.e.; bonding and materials purchase capacity) to meet the obligations of the work.

e. List of structural, electrical, and other subcontractors intended to do the work. Subcontractors shall be appropriately state licensed in their specialty.
f. Provide with proposal, the name and relevant experience of the proposed project manager. Also provide the name and qualifications of the site superintendent.

B. Contract Qualifications

1. At least 3 years experience in the installation of reduction curtains or similar products. Proposals will be rejected as unresponsive should the following information not be provided with proposal.
2. Experience with comparable scale projects.
3. With the bid, the potential curtain manufacturer shall provide documentation that they have:

a. Adequate plant capacity and equipment to complete the work.
b. Adequate staff to perform work on schedule proposed with commensurate technical experience.
c. Provide references of three or more users for previously furnished and/or installed reduction curtain systems.

## 1.5 PRE-INSTALLATION SUBMITTALS

A. Project Submittal Part 1:

1. Provide for approval not later than thirty (30) days after issuance of Notice to Proceed and prior to commencement of Work:

a. Section 1: A complete schedule of submittals.
b. Section 2: A chronological schedule of Work. Revise and resubmit schedule as required to reflect construction progress.

B. Project Submittal Part 2:

1. Provide for approval no later than thirty (30) days after issuance of notice to proceed and in accordance with previously submitted submittal schedule.

a. Section 1: Complete list of product to be incorporated within the Work.
b. Section 2: Manufacturer's data sheets for each product.

c. Section 3: Fabric Samples.

1) Submit a one square foot sample of the fabric specified for approval.

d. Section 4: Submit Material Safety Data Sheets (MSDS) for each potentially hazardous material prior to use. Include information pertaining to the hazardous material with the MSDS.
e. Section 5: Submit sample certificates of flame retardance for all fabric types to be provided.

2. Drawings:

a. Provide drawing of overall Coliseum installation plan for curtain, showing locations of control panels and pendant control.
c. Drawings depicting attachment of equipment to structure or mechanical assemblies that support overhead loads must show the Work has been reviewed and sealed by a structural engineer licensed to practice in the State of Wisconsin.
d. Installation Drawings. Provide drawings showing special details depicting methods and means specific to each product and each product manufacturer's recommended installation methods and means. Provide assembly and attachment for each product. Drawings should be reviewed and stamped by a registered structural engineer in the State of Wisconsin.
e. Conduit and Electrical Drawings. If the system incorporates an electrical or electronic system of any type, provide floor plan drawings, showing exact power requirements and conduit routing for each system with the location of all junction boxes, terminations, etc.
f. Equipment Drawings. Provide equipment mounting and location details including necessary physical dimensions, clearances, load limits, etc.
g. General Detail Drawings. Provide detail drawings depicting any unique installation methods specific to each product.
h. Any other pertinent data generated which is necessary to provide the Work.

D. Submittal Format:

1. Provide each submittal with a unique number and be numbered in consecutive order.
2. Drawings executed at an appropriate scale, not smaller than ⅛" = 1'-0" for ceiling/floor plans, ¼" = 1'-0" for equipment layouts, and ½" = 1'-0" for mounting details and plate/panel details.

E. Submittal Copies:

1. Submit three copies of submittal information.
4. Submit two copies of product or sample finishes as required within this specification.

F. Resubmission Requirements:

1. Make any requested corrections or change in submittals required. Resubmit for review until no exceptions are taken.
2. Indicate any changes that have been made other than those requested.

G. Approval of Submittals: The submittal information will be reviewed by the County. Each submittal package will be returned to Contractor after review. No fabrication or Work is to be undertaken prior to County approval.

## 1.6 PROJECT RECORD MANUAL

A. Submit three bound original sets (this is a minimum of two for the County; additional copies may be required by the project's general conditions) after substantial completion and prior to final inspection.

B. The Project Record Manual shall be segregated into three separate bindings as follows:

1. Operations Manual:

    a. Product Data: Product actually incorporated within the Work:

        1) Manufacturer's data for each type of product conforming to the scheme above. The list shall include manufacturer’s serial numbers.
        2) Owner/Instruction Manual for each product.
        3) For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item.
        4) Manufacturer's wiring diagram for each type of product actually incorporated.
        5) Separately bound list by manufacturer and model or part number of all products incorporated within the Work arranged in alphanumeric order.

    b. Record drawings: Final rendition of that specified depicting what is actually incorporated within the Work.
    c. Test Reports: Recorded findings of testing specification of this specification.
    d. System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity.

        1) This procedure should describe the operation of all system capabilities.

2. Service & Maintenance Manual:

    a. Provide an original copy of the service manual on every piece of equipment for which the manufacturer offers a service manual. Arrange manuals in the same order as the operations manual.
    b. Manufacturer’s maintenance and care instructions.
    c. Maintenance Instructions, including maintenance phone number(s) and hours; maintenance schedule; description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
    d. Replacement parts list of all minor equipment such as fuses, etc.

3. Warranty Manual:

    a. Manufacturer's warranty statements on each product.
    b. Date of substantial completion and ending dates for warranties for each group of products.
    c. Software registration and licenses.

4. Certification of Curtain Flame-retardance:

    a. Provide all certificates, test reports, and documentation required for as required by the local jurisdiction certifying the flame-retardant characteristics of all finished curtain pieces provided in the work.

C. Include any other pertinent data generated during the Project or required for future service.

D. Appropriately duplicate data within the separate bindings when it will reasonably clarify procedures, e.g., operational data in maintenance binding.

1.7 PROJECT CONDITIONS

A. Verify all conditions on the jobsite applicable to this work. Notify County's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The Contractor is responsible for all electrical (high and low voltage) and structural work for completed systems.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Ship product in its original container, to prevent damaging or entrance of foreign matter.

B. Handling and shipping in accordance with manufacturer's recommendation.

C. Provide protective covering during construction, to prevent damaging or entrance of foreign matter.

D. Replace at no expense to County, product damaged during storage, handling or the course of construction

A.9 FINAL INSPECTION AND TESTING

A. Upon completion of installation, initial adjustments, tests and measurements specified in Part 3, and submission and review of the results, a final inspection and test will be observed by the Alliant Energy Center Coliseum staff (County).

B. Testing includes operation of each major system and any other components deemed necessary. Perform tests and provide required test equipment, tools and material required to make any necessary repairs, corrections, or adjustments.

D. The following procedures will be performed on each System:

1. Inspection of the methods and means employed to incorporate the System within the facility.
2. Verification of proper operation, from controlling devices to controlled devices.
3. Verification of proper adjustment, balance, and alignment of equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each setting, and appropriately record these settings within the Record Documents.

E. In the event the need for further adjustment or work becomes evident during testing, the Contractor is to continue Work until the System is acceptable at no addition to the contract price. If approval is delayed because of defective equipment, or failure of equipment or installation to meet the requirements of these specifications and any extension of the inspection and testing period is required, the contract price will be reduced for the additional time and expenses of the County, at the standard rate in effect at that time.

F. Contractor shall return to the jobsite six months after acceptance to:

1. Inspect the rigging hardware and attachments, hoists, controls and aluminum truss.

2. At the same visit Contractor shall inspect curtains and attachments and re-trim all curtains.

## 1.10 WARRANTY

A. Warrant labor and product for one (1) year following the date of the Final Acceptance by County.

B. System to be free of defects and deficiencies, and to conform to the drawings and specifications as to kind, quality, function, and characteristics. Repair or replace defects occurring in labor or product within the Warranty period without charge. Any cost required to complete this warranty repair is the responsibility of the Contractor.

C. This warranty is in addition to any specific warranties issued by manufacturers for greater periods of time.

## 1.11 TRAINING OF COUNTY STAFF

A. After final completion, provide instruction to County and/or the County's designated personnel on the use, operation, maintenance and care of the System.

1. Develop training course based on the use of the System and manufacturers' recommendation. Provide four (4) hours of training. All training shall be scheduled at the convenience of the County and County designated personnel.

# PART 2 - PRODUCTS

## 2.1 SPECIFIED PRODUCTS & MANUFACTURERS

A. Any model numbers and manufacturers included in this specification are listed as a standard of quality. Each device shall meet all of its published manufacturer's specifications. Verify performance as required.

B. Suppliers approved to respond to this RFP are listed with no implication or certification that their proposed products meet the technical requirements of this specification. Other suppliers submitting as 'equal' will also have their submissions reviewed for compliance with the Contract Documents.

1. Nickerson Arena Curtains
2. Athletic & Performance Rigging
3. Tomcat, Inc.
4. iWeiss Theatrical Solutions
5. CM Lodestar
6. SmartStage
7. Xtreme Structures and Fabrication
8. Applied Electronics

9. Motion Laboratories, Inc.

## 2.2 UPPER-BOWL REDUCTION SYSTEM

A. Hoisting

1. Performance/Design Requirements:

a. Employ a Professional Engineer registered in Wisconsin to design and engineer truss framing systems and hoisting systems in compliance with the following criteria.

1) Hoist speed: 16 feet/min. minimum.
2) Curtain sag: None.
3) Truss deflection: None.

b. Safety factor: 8:1 for all overhead suspension.
c. Curtain to provide arena reduction as indicated on drawings.
d. Curtain to provide a level horizontal line along curtain panel top edge.
e. All electrical components shall bear UL label.

2. Truss and motorized hoisting

a. Aluminum three dimensional truss - natural finish.

b. Brackets: brackets for attachment shall be located at designated points of the overhead super-structure that meet the existing Alliant Energy Center Rigging Guidelines.
c. Motor drive system: the drive system shall consist of 480V motor, electro-magnetic brake, and up/down limit switches.

3. Controls

a. Control panels shall be lockable.
b. Secondary push-button operator controls shall be located on the face of the motor control cabinets panels at the catwalk level.
c. Control unit shall be ground fault protected, and constructed per NEMA standards.
d. Back boxes, junction boxes, devices, and conduit shall meet requirements of project specified in respective sections.

B. Curtain

1. Material:

a. Provide an opaque inherently flame retardant fabric in compliance with NFPA 701 flame spread requirements.
b. Curtain shall consist of a IFR 100% Avora Polyester P.D. cloth by Dazian, Inc., or approved equal. Curtain material shall be sewn flat.
c. Proposal may also include an alternate curtain of vinyl coated polyester with a velour laminate on the event side which can be considered by the County.

2. Construction:

a. Curtain shall be sewn flat (or flat welded construction if alternate is chosen).
b. Curtains shall be fabricated from full length cuts with no horizontal seams.
c. Curtains shall have D rings sewn to the "back side" to accommodate the lift cables. D rings shall be located at 30" O.C>.
d. Curtains shall have a pocket at the bottom to accommodate a 1-¼" batten pipe. The top of the curtain shall have grommets at 12" OC for attachment to the supporting truss.

3. Color: to be Black.

## 2.3 ARENA FLOOR REDUCTION CURTAIN SYSTEM

A. Alloy Truss

1. Provide entertainment industry standard truss sized to the application.
2. All fabrication shall be by certified welders.

B. Chain Hoists:

1. Provide multiple motorized chain hoists sized to the load(s) required and designed for permanent suspension of equipment above the public.
2. Hoist motors shall mount within the truss assembly and must be attached by a removable means to allow annual maintenance and required service.
3. Hoists shall:

a. Operate at a nominal 208VAC/3-Phase.
b. Have a maximum travel suitable to the application.
c. Operate at a nominal 16 ft.sec.

4. Hoists shall consist of an integrated motor, gearbox, and brake mounted in a heavy-duty case sealed from dirt and other contaminants.
5. The hoist brake shall be direct-acting electrically-released and must provide fail safe breaking in the event of a power failure.
6. Each winch shall have an integrated, field-adjustable limit switch assembly coupled with the drive train. Switches shall sense normal and emergency over-travel positions at both ends of the range of operation.
7. Lifting chain shall be of a specialty alloy sized for the anticipated loads and designed for overhead lifting.
8. As load is lifted, loose chain shall feed into a suitable receptacle attached to the hoist for storage to be constructed of abrasion, water and tear resistant.. Bag shall have a steel frame and hardboard bottom combined to accept 270 inch-pounds with a 5:1 safety ratio.

C. Hoist Control

1. The control mechanism must allow-

a. Simultaneous operation of hoists to ensure level operation of the canopy structure.
b. Independent operation of any single hoist to allow precise leveling of the canopy structure.
c. The operator interface shall consist of a portable pushbutton panel. The operator shall choose the hoists to operate and direction of travel from panel-mounted

selector switches. The operator shall depress a momentary acting switch to initiate motion and release the switch to stop motion.

e. The operator interface shall have an emergency stop button that will safely halt all motion by removing power from the system when depressed. E-stop Button shall be red mushroom style; action shall be push to stop and twist to release. Releasing the emergency stop shall not allow motion to re-initiate until the operator has reset the system.

d. Operator interface and controller will reside at the catwalk level. All hoists shall be wired with individual sets of temporary cabling to a common control location.

e. Provide all power and control interconnect cabling as required for proper operation of the system.

f. Provide remote station Operating device:

1) Heavy duty, injection-molded, plastic hand held device.
2) Tail: One hundred (100) feet
3) Power Present: 12 V DC nominal maximum.
4) Capable of operating four through eight individual hoists separately, all, or any simultaneously.
5) Hoist Control Functions: Up, down, stationary, system go, and system kill

i. Provide suitable motor control power distribution:

1) Constructed of 1/8 inch thick aluminum "U" channel with 1 inch flanges.
2) Panels shall bolt together to allow modular assembly.
3) Fit standard 19 inch rack rail.
4) Contractor Enable function allowing individual local (pickle) control.
5) Phase OK light (3 phase systems) to verify all 3 phases present and in correct sequence.
6) Phase Reverse function
7) Dual (redundant) contactors for Phase Reverse and System kill.
8) Constructed with Twist-Lock, P-14 (canon), Socapex, Sine, VSC or equal connectors.
9) Input connectors by Twist-Lock, Camlok, or equal
10) Parallel flanged outlet for daisy-chaining units.
11) UL listed breakers for all outlets; at least one breaker per pair of hoists per NEC 96.
12) Cannon Tail / Hubbel breakout or equal: 26 pin cannon connector allowing connection to remote station.

D. Rigging Hardware

1. Provide miscellaneous rigging hardware in necessary sizes and quantities to support the installation described.
2. Hardware components shall include

a. Endless slings to connect chain motors to truss shall be Steelf1ex Round Slings, manufactured by LiftAll or approved equal. Polyester round slings are not a acceptable.

b. Endless slings for fly cable strain relief shall be Tuflex Round Slings, manufactured by LiftAll or approved equal.

c. Steel slings shall be made of dry 3/8" 6xl9 EIP, IWRC cable with standard swaged eyes. Sling to have a stamped label with serial number, manufacturer name, and proof test verification. Each sling is to be provided with two industry standard

burlap bags to cushion the sling when wrapped around the building structural steel.

d. Screw Pin Shackles shall have a black phosphate glare resistant finish. Bow shall be forged from micro alloy steel with integral heat-treating. Pins shall be forged from 4140 alloy steel and heat-treated. Shackle shall meet or exceed strength requirements for Federal Specification RR-C-27L.

e. Bridling Chains shall be theatrical specialty alloy Stac-type sized for the loads.

E. Curtains

1. General Specification for Curtains

a. Provide all curtains as described on the drawing and in the Basic Requirements..

b. Field verify all dimensions prior to fabrication of curtains.

c. Curtain fabric of professional grade fabric intended for coliseum or arena use. Curtain fabric shall be inherently flame-retardant. Flame proofing certificates for all fabrics used shall be furnished to the owner with the as-built drawings.

d. Sew tags identifying manufacturer and size of panel at each end of webbing at top and at one corner at hem in each drape.

e. Curtains must be constructed with vertical seams unless otherwise specified. The fabric grain shall run nap down and match in all panels. All panels must be un-spliced along their height.

f. Construction

1) Polyester webbing at 3-1/2" wide shall be double stitched at 2-3/4" spacing to the top of the curtain with 1-inch of face fabric turned under the webbing.

2) Curtain shall have machine set black anodized #3 grommets set

(a) at the extreme top corners, and
(b) in the pleat centers of curtains sewn with fullness, or
(c) on 12" centers for flat curtains.

3) Provide black tie-lines of #4 cord a minimum of 24" long or of sufficient length to onto 2-inch nominal diameter pipe or tube supports.

4) The centerline of the drape shall be marked on the top webbing with "CL".

5) Bottom hems shall be 6" wide. These shall be sewn with a separate canvas chain pocket inside so that the bottom of the canvas pocket rides 2 inches above bottom of the hem. Provide #8 plated jack chain in the pocket.

6) All curtains shall be sewn with a minimum 4" of face fabric turned back at the each edge.

g. Use matching polyester thread, minimum weight of #16, color to match drape fabric.

h. Fabric colors shall be as noted. Submit color sample card with submittal documents. Ensure that curtains of the same color are fabricated from fabrics of the same dye lot

2. Labeling

a. Sew labels onto the back (in most cases, upstage) side of the upper hem at both ends of each panel.

b. Labels shall clearly indicate

1) date of manufacture

2) cloth type
3) manufacturer's name and address
4) size (width and height using 3/4" minimum lettering
5) owner's designated inventory number

3. Size:

a. Provide panels at maximum width of 20 feet and height as described on the drawings.
b. Provide quantity to provide width across arena floor as described in the drawing plus 20 pct.
c. Fullness

1) Base bid: 0pct. (sewn flat)
2) Alternate: 50pct. fullness (w/ box pleats)

4. Acceptable product:

a. Color: black
b. Nominal 18-20 ounce fabric:

1) KM Fabrics Crescent inherently flameproof velour.
2) Dazian inherently flameproof polyester fabric.

F. Miscellaneous equipment

1. Curtain Self-Storage: Provide curtain storage diapers to attach to trussing with Velcro- type dome straps on one foot centers that enable all reduction curtain to self-store.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate incorporation of the Work specified herein with other project work so as to facilitate a cohesive final product.

B. Mount equipment and enclosures plumb and level.

C. Permanently installed equipment to be firmly and safely held in place in accordance with specified safety factors and Federal and State codes and regulations.

D. Work shall be completed within industry guidelines, including, Entertainment Services and Technology Association (ESTA), OSHA, National Electric Code, American National Standards Institute, American Society for Testing and Materials, American Institute of Steel Construction, National Fire Protection Association, National Electrical Manufacturers Association, plus any or all local, governmental, or other applicable codes.

E. Where dimensions and loading capacities have been omitted from this specification, they are to be determined by the theatre rigging contractor, in accordance with the accepted industry standards and guidelines in this section. In no way will the Contractor be relieved of primary responsibility to provide a safe, fully functional system.

F. The mechanical fabrication and workmanship will incorporate the best practices for good fit and finish. There will not be any burrs or sharp edges to cause a hazard nor will there be any sharp corners accessible to personnel.

G. All equipment will be installed based on the manufacturer's recommendations and for the use intended by the manufacturer.

H. All shop and field welding will meet the qualifications of the AISC manual and will be without spatter or other evidence of poor practices.

3.2 LABELING OF EQUIPMENT

A. Mark and label each batten with its set number, load/arbor capacity, stage centerline, and lift line locations with appropriate paint.

B. Provide labels clearly indicating date of manufacture, cloth type, manufacturer's name and address, size (width and height using 3/4" minimum lettering), and County's designated inventory number (to be coordinated with County) will be sewn into the back (in most cases, upstage) side of the upper hem at both ends of each drape panel.

3.3 CONTRACTOR COMMISSIONING

A. Prior to energizing or testing the System ensure the following:

1. Products are installed in proper and safe manner according to manufacturer’s instructions.

2. Dusts, debris, solder splatter, etc. is removed.
3. Labeling has been provided.
4. Products are neat, clean and unmarred and parts securely attached.
5. All end-of-travel and emergency over-travel limit switches must be set and verified.

B. Provide two portable VHF or UHF business band radios for use during acceptance testing with transmission range sufficient to cover entire project.

1. Include rechargeable batteries and re-charger along with "holster" for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance.

END OF SECTION 116133