PERMANENT I-BEAM STYLE GRANDSTAND —

SECTION 13 34 16

PART 1 — GENERAL

1.1 General

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 — Specification sections, apply to work of this section.

1.2 Scope

A. These Specifications cover the requirements for the design, fabrication, delivery and installation of the permanent I-beam style grandstand system, including the following:

1. Concrete foundations
2. Structural steel framed understructure
3. Aluminum treads and risers
4. Aluminum Aisle steps
5. Guardrails and handrails
6. Seating
7. Ramps, stairs and landings
8. Vertical closure
9. Grandstand finishes

1.3 Related Sections and Documents

A. Concrete — Division 3

B. Stadium Seating — Division 12

C. Pressbox — Division 13

1.4 Codes and Standards

A. Perform all work in accordance with the latest editions and revisions of the following standards, which hereby become part of this section.

1. ICC 300 — Standard for Bleachers, Folding and Telescopic Seating and Grandstands
2. International Building Code, Edition 2018 **[2015, 2012]**
3. Local Building Code Amendments **[LIST STATE]**.
4. AWS D1.1 — Structural Welding Code — Steel
5. AWS D1.2 — Structural Welding Code — Aluminum
6. AISC 360 — Specification for Structural Steel Buildings

7. Aluminum Design Manual (ADM), 2015
8. ACI 318 — Building Code Requirements for Structural Concrete
9. American Galvanizers Association (AGA)
10. The Society for Protective Coatings (SSPC)

1.5 Grandstand Contractor Qualifications

A. Manufacturer/Fabricator Qualifications:

1. Experience: Manufacturer/fabricator with not less than 10 years experience with successful production of products and systems to the specified scope of Work, with a record of successful in-service performance and completion of similar projects for a period of not less than 10 years, and with sufficient production capability, facilities, and personnel to produce required Work.
2. Approved manufacturer:

   a) Dant Clayton Corporation — Louisville, KY
3. Manufacturer/fabricator shall be an AISC Certified Fabricator.

B. Installer Qualifications:

1. Experience: Installer with not less than 5 years experience in performing specified scope of Work, with a record of successful in-service performance and completion of projects for a period of not less than 2 years, and with sufficient production capability, facilities, and personnel to produce required Work.
2. Manufacturer/Fabricator Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer/fabricator to install products.

C. Delegated Engineering Responsibility: Contractor shall employ a qualified professional engineer licensed in the state where the project is located to provide engineering for products and systems as required.

1.6 Performance Requirements

A. Design Loads: Engineer to withstand design loads including but not limited to gravity, wind, seismic, and erection design loads and shrinkage/thermal movements as established by authorities having jurisdiction, applicable local building codes, and as indicated.

1. Superimposed Dead Load . . . . . 6 psf
2. Live Load . . . . . 100 psf
3. Sway Load . . . . . 24 plf per row parallel to row
4. Sway Load . . . . . 10 plf per row perpendicular to row
5. Wind Load . . . . . Design per local building code
6. Seismic Load . . . . . Design per local building code
7. Guardrail Loads . . . . . Design per local code

B. Grandstand System Self Weight: Self-weight of the grandstand system shall be incorporated into the project calculations for both foundations and framing.

C. Structural Deflections: Limit live load deflections of aluminum footboards, aluminum seatboards and structural steel framing and any other flexural members to L/200 of the span.

D. Structural Drift: Limit the horizontal frame drift of the grandstand system to H/200 of the frame height under sway, wind and seismic loads.

E. Dimensional Tolerances: Engineer and detail products, systems and connections back to primary structural elements to accommodate fabrication tolerances and dimensional tolerances of framing members and adjacent construction.

1.7 Submittals

A. Approval Drawings: Submit for review detailed approval drawings as follows:

a) All dead, live, and other applicable loads used in the design.

b) Detailed and dimensioned foundation, framing, layout, and seating plans.

c) Foundation sizes, locations and elevations shall be shown in compliance with surrounding Work and relationships to finish grade.

d) Seating plan indicating all aisles, walkways, seating sections and exits.

e) Sections and details showing complete methods of assembly and anchorage:

i. Show riser heights and platform widths.

ii. Show stair and ramp sections including railings.

iii. Show overall sections showing railings systems, sightlines (when required by scope).

f) Connection details showing size, type, and grade of all plates, bearings, inserts and anchors.

g) Finishes.

h) Joint covers.

2. All approval drawings submitted shall be sealed by a professional engineer who is licensed in the state where the project is located.
3. Equipment Hung From Seating Units: No pipe, ducts or other equipment shall be hung from the seating units without written approval of the Delegated Design Engineer. Coordinate all attachment methods and fastener types with the Delegated Design Engineer to ensure they are suitable for the selected system.

B. Delegated Design Engineering Calculations: Calculations submittal for products indicated to demonstrate conformance with specified design loads, element stiffness and performance requirements including structural analysis data signed and sealed by the professional engineer responsible for their preparation licensed in the state where the project is located.

C. Qualification Data: For firms and persons specified in "Quality Assurance" to demonstrate their capabilities, experience and qualifications. Submit for record lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

1. Manufacturer qualifications
2. Professional Engineer qualifications

D. Samples for Verification: For each type of exposed material, color, finish and texture.

E. Warranty: Sample of standard warranty.

1.8 Delivery, Storage and Handling

A. Delivery: Deliver grandstand components in such quantities and at such times to sufficient for construction activities to occur without delay.

B. Storage: Store components with adequate dunnage.

C. Handling: Handle and transport components in a position consistent with their shape and design to avoid excessive stresses which would cause damage.

1.9 Quality Control by Contractor

A. For grandstand members furnished under this Section, quality control inspection and testing shall occur during the manufacture of the components, and the components are subject to the approval of the engineered seating bowl supplier's Quality Control Manager.

B. Plant Quality Control: Provide copies of plant quality control program describing procedures for the following:

1. Overall quality control measures
2. Verifying sizes and critical dimensions of members.
3. Verifying position of plates, inserts, and other embedded items.
4. Final inspecting of products prior to shipment.
5. AISC certification

1.10 Warranty

A. Special Warranty: Manufacturer's standard 1-year warranty is required in which manufacturer agrees to repair finish or replace components that fail in materials or workmanship within specified warranty period.

PART 2 — PRODUCTS

2.1 Permanent I-Beam Grandstand System Components

A. Single Source Responsibility: Furnish each type of product from a single manufacturer/fabricator. Provide secondary materials only as recommended by manufacturer/fabricator of primary materials.

B. Basis of Design: The design for permanent I-beam grandstand is based on a system designed and engineered by Dant Clayton.

C. Concrete Foundations and Slabs: Design concrete foundations where shown on drawings in accordance with the project Geotechnical Investigation (provided by others).

1. Foundations shall meet frost depth requirements.
2. All design, detailing, fabrication and installation shall be in accordance with ACI 318.
3. Cast-in-place concrete shall have a minimum compressive strength of 4,000 psi with air entrainment of 6% +/- 1%.
4. All reinforcing steel shall be in accordance with ASTM A615 with a minimum yield strength of 60,000 psi.

D. Structural Steel Framing

1. All detailing, fabrication, and erection shall be in accordance with the AISC Specification for Structural Steel Buildings.
2. All fabrication will be completed in a certified AISC facility.
3. Structural steel shall be ASTM A992 multi-certified grade 50.
4. Miscellaneous steel shall be ASTM A36.
5. Structural tubes shall be ASTM A500 grade B or C.
6. Bolts and nuts: All bolts 5/8-inch diameter and larger shall meet ASTM F3125 grade A325; ½-inch diameter and smaller shall meet ASTM A307.
7. Washers shall meet ASTM F436.
8. Threaded rod shall be ASTM A36 or F1554 if used for anchorage to concrete.
9. All welds shall conform to ANSI/AWS D1.1, latest edition. Electrodes shall be E70XX.

E. Aluminum: Provide aluminum components at locations as shown on drawings, noted below and in compliance with the following:

1. All detailing, fabrication, and erection shall be in accordance with the code required edition of the Aluminum Design Manual.

F. Welded Aluminum Tread and Riser System

1. Fully closed and welded deck system using 6063-T6 extruded aluminum with continuously welded tongue and groove joints.
2. The decking system has two components as follows:

a) The first component is a one-piece welded deck panel constructed by welding multiple aluminum extensions together in the factory utilizing a fully automated, computer controlled, multi-head welding machine. The welding machine will weld all extrusions together in a single pass with .040" diameter 4043 weld wire using Orlion Gas to insure uniform shape, dimension and appearance.

b) The decking system is attached by concealed clips and galvanized hardware.

c) The decking extrusions are 1.75" vertically with a .078" wall thickness and are interlocked horizontally prior to welding using a tongue and groove connection.

d) Finished welded decking will be free of irregular welds and pin holes in aluminum decking due to poor workmanship of welding process. Components that contain irregular welds and pin holes will be rejected and replaced.

e) The second component is a vertical interlocking flat aluminum riser that attaches to female nose of tread, rotates down into position and overlaps the rear heel of tread below and is secured with a mechanical screw fastener.

3. The decking system will span approximately 6 ft over supporting structure.
4. There will be a ½" gap at joint of the welded deck panels to allow for expansion and construction of the aluminum due to temperature variations.
5. The joint of the deck system is covered with a 4" wide aluminum extrusion joint cover (see Joints).

The ends of the decking system will be finished with a one-piece aluminum angle end cap (see End Caps).

G. [remove section in full if not specifying interlocking deck] Interlocking Aluminum Tread and Riser System

1. Fully closed interlocking deck system using 6063-T6 extruded aluminum with tongue and groove joints.
2. The decking system has two components as follows:
   a) The first component is the horizontal deck which is composed of individual aluminum decking extrusions that are 1.75" vertically with a .078" wall thickness and interlocked in the field with a tongue-and-groove joint.
   b) The decking system is attached by concealed clips and galvanized hardware.
   c) The second component is a vertical interlocking flat aluminum riser that attaches to female nose of tread, rotates down into position and overlaps the rear heel of tread below and is secured with a mechanical screw fastener.
3. The decking system will span approximately 6 ft over supporting structure.
4. There will be a ½" gap at joint of the welded deck panels to allow for expansion and construction of the aluminum due to temperature variations.
5. The joint of the deck system is covered with a 4" wide aluminum extrusion joint cover (see Joints).
6. The ends of the decking system will be finished with a one-piece aluminum angle end cap (see End Caps).
7. The entire interlocking deck system will be sloped one degree forward to cause water to drain to the front of the grandstand. Gutters and open channels in the decking system are specifically prohibited (see Water Management).

H. Aisle Steps

1. Aisle step units are to be provided at all intermediate aisle locations as shown on the architectural drawings and be made from 1.75” aluminum extrusions and plate material.
2. Aisle step units shall be mounted to the stadia system with pop rivets or galvanized hardware.

3. Aisle steps will be designed to satisfy row depth with vertical closure panels at the ends of the intermediate steps. No cavity or recessed closure is allowed in area of foot travel.
4. Provide a finish and texture matching that of the stadia tread and riser system to which they are installed. See Finishes.
5. Provide stair nosing at steps and treads.
6. Shall be designed to resist loads imposed from any step mounted rails.

I. Guardrail and Handrail System

Chain Link Fence Guardrail System:

a) Vertical guardrail structural supports shall be aluminum rectangular tube 2.8" x 2.0 x .1888" or aluminum angle of equivalent strength and shall be 6061-T6 alloy. Guardrail shall have structural support on each leg of the fencing at all 90 degree turns. Steel angle supports do not meet this requirement and are not acceptable.

b) Guardrail horizontal and vertical framing members will be 1 5/8" O.D. aluminum pipe.

c) Chain link fence shall be [2" x 9 ga mesh, galvanized fabric.] [2" x 6 ga black vinyl coated fabric.]

d) Vertical guardrail supports will have cast aluminum safety end caps on top and bottom.

2. Guardian Vertical Picket Rail Guardrail System

a) Vertical guardrail support post shall be square structural steel tube HSS2x2x3/16 (min) using ASTM A500 Gr B material. Guardrail shall have structural support on each leg of the fencing at all turns.

b) Infill panels shall bolt to the vertical post with top and bottom rails of 1½" structural steel channels with ½" structural steel balusters spaced at no more than 4" c/c.

3. Handrail System

a) Aluminum handrails shall be provided in all areas required by building code and as indicated on the architectural drawings at all locations of new aluminum stadia treads and risers.

b) Handrails shall be 1 15/16" O.D. extruded aluminum pipe. Straight pipe shall be 6061-T6 aluminum alloy with minimum yield strength of 35 ksi. Bent pipe shall be 6061-T4 aluminum alloy with minimum yield strength of 21 ksi.

c) Aisle handrails shall be two-line and feature internal fittings for both lines of rail. External fittings are not permitted.

d) Aisle handrails shall be mounted to the aisle steps with connecting bracket or floor flange.

e) Handrails on all ramps and stairs shall provide 1½" clearance from the guardrail material and shall extend 12" past the last riser with a return. Newel posts will not interrupt handrails. Handrails will not project more than 4.5" into the width of a stair or ramp.

J. Seating

1. Aluminum Bench Seats:

a) Aluminum bench seats shall be 6063-T6 extruded aluminum with a fluted surface and a minimum of 4 vertical legs making up the extrusion.

b) The exact size of seat board is 2" x 10" x .080" wall thickened at the joints and weighing 1.9 lbs. per foot with 1" radius comfort curve front edge.

c) Aluminum shall be cleaned, pre-treated and clear anodized (unless otherwise noted in Finishes).

2. Aluminum Bench Seats with Backrest:

a) Shop bent aluminum backrest stanchion brackets shall be 6063-T6 extruded aluminum attaching at each bench seat mounting bracket.

b) Stanchions shall be heat treated and clear anodized (unless otherwise noted in Finishes).

c) Contoured 7" aluminum backrest shall be 6063-T6 extruded aluminum with fluted surface and extruded legs that allow it to rest on the tops of the stanchion brackets.

d) Ends of backrest will have cast aluminum endcaps.

3. Mounting Brackets:

a) Made from 3/16" thick (min) A36 steel plate, plasma cut, bent and hot dip galvanized.

K. Stairs

1. Stairs are constructed of structural steel understructure and aluminum tread and riser system

2. Structural understructure consists of C12x10.6 steel channels for outside stringer assemblies, L3x3x1/4 steel support legs at locations identified on plans, and FL1/4x2 steel flat strap x-bracing between support legs where indicated on plans
3. Aluminum treads are 1¾" x 11" 6063-T6 extruded aluminum planks spaced equally between landings with a maximum of a 7" rise
4. Interlocking flat aluminum riser will attach to female nose of tread, rotate down into position and overlap rear heel of tread below and secured with mechanical screw fastener.
5. Handrail will be inset from guardrail 1½" to 3". Guardrail will not be used for handrail.
6. Guardrailing to match grandstand design unless otherwise noted.
7. Provide stair nosing at steps and treads.

L. Ramps

1. Frames shall be 9" x 1.40 extruded aluminum mill finish channel with 3" x 1.4" extruded aluminum mill finish vertical channel columns.
2. Treads shall be 6063-T6 extruded aluminum with a fluted surface and a minimum wall thickness of .078". Minimum vertical height of treads shall be 1.75" actual.
3. Handrail will be inset from guardrail 1½" to 3". Guardrail will not be used for handrail.
4. Guardrailing to match grandstand design unless otherwise noted.
5. Anti-skid tape is not allowable to correct for deviations to paragraph 4 above.

M. End Caps

1. Walkways, footboards and aisle board end caps shall be one-piece mill finish aluminum angle design tumbled after fabrication to remove burrs and sharp edges. End caps shall be riveted to the planks.
2. Seat board end caps shall be one-piece cast aluminum and shall be friction — fit to the plank without the use of mechanical fasteners. Plastic end caps are not permitted.
3. CLF Guardrail posts shall be covered with cast aluminum top and bottom safety caps.

N. Vertical Closure System

1. Corrugated Aluminum Riser

a) Riser closure shall consist of an overlapping configuration of 8" x 0.100" wall thickness 6063-T6 aluminum extrusions, with a 1" forward facing corrugation.

b) Riser overlap shall be ½" min. and 2" max.

c) Riser closure to span between rail post spaced at 6'-0" c/c.

d) Aluminum top cap to be provided where gaps are created between top of closure and decking walking surface.

e) Closure to be attached to rail post with stainless steel mechanical screws.

O. Joints: Unless shown otherwise on the drawings, provide joint widths as follows:

1. Joints at member ends abutting walls: ¾"

2. Joint width between ends of adjacent seating units: ¾"

3. Joints shall be concealed with an aluminum joint cover specified by the manufacturer.

P. Finishes

1. Structural Steel:

a) All structural steel framing shall be hot dip galvanized in accordance with ASTM A123.

b) **[REMOVE IF NOT REQUIRED] All structural steel framing shall be powder coated meeting AAMA 2604 specification for Super Durable Polyester TGIC**

c) All structural hardware shall be hot dip galvanized in accordance with ASTM F2329.

d) All structural steel brackets and fasteners shall be hot dip galvanized in accordance with ASTM A123.

2. Aluminum:

a) Aluminum Finish Descriptions:

i. Mill Finish: natural appearance of the aluminum as it comes from the rolling mill with no further surface treatment.

ii. Anodized Finish: Anodized aluminum provided shall meet or exceed AAMA 611-14 specifications for Anodized Architectural Aluminum

iii. Powder Coat Finish: Powder coat system provided shall meet or exceed AAMA 2604 specification for Super Durable Polyester TGIC

iv. Slip Resistant Deck — SRD: Mill finish aluminum that has a sandblasted walking surface to meet the textured finish noted below

v. Stain and Slip Resistant Deck — SSRD: Powder coat and textured finish meeting the textured finish noted below, and the powder coat finish above

b) Footboards and Walkways

i. Mill

ii. SRD

iii. SSRD

iv. SRD/Anodized

v. Slip Resistance of Walking Surfaces:

(1) All stadia system walking surfaces will provide an equivalent or greater Static Coefficient of Friction (SCOF) of 0.6 in all directions of travel, using ANSI/NFSI B101.1-2009 testing method by the National Floor Safety Institute.

c) Risers

i. Anodized

ii. Powder Coated

d) Seat boards

i. Anodized

e) Seat backs

i. Anodized

ii. Powder Coated

f) Vertical Closure

i. Anodized

ii. Powder Coated

PART 3 — EXECUTION

3.1 Examination

A. Examine substrates, areas and conditions with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.

B. Before installation proceeds, installer shall prepare written report, endorsed by installer, listing conditions detrimental to performance of the work. This includes survey of elevations and locations of concrete foundations or pads and anchor bolts to verify compliance with the requirements of the grandstand manufacturers' specified tolerances.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Install grandstand and all components according to manufacturer's written instruction and the approved shop drawings.

B. Do no field cut, drill or alter structural members without written approval from grandstand system manufacturers' engineer.

C. Set structural framing in locations and to elevations indicated and according to AISC specifications.

3.3 Cleaning

A. Clean all surfaces according to manufacturer's recommendations

B. Use cleaning solutions and methods that do not damage finishes or the adjacent surfaces.

C. Mill finish aluminum surfaces are unprotected from oxidation. All mill finished aluminum will oxidize at various rates during the manufacturing, shipping, installation and usage of the grandstand as it is exposed to various weather conditions. Oxidation is natural and expected, and in no way impacts the life cycle or structural performance of the grandstand. Grandstand manufacturer is not responsible for repair, replacement or cleaning of oxidized aluminum.

D. Remove all metal burrs, sharp edges or other cutting, unsafe, conditions.

E. Touch up finishes as recommended by manufacturer.