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**SECTION 41 22 13 – OVERHEAD CRANES AND HOISTS**

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**SECTION 41 22 13****OVERHEAD CRANES AND HOISTS****PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1 Specifications Sections, apply to this Section.

**1.2 SECTION INCLUDES**

- A. Monorail and Hoist
  - 1. Unless otherwise noted, this section includes furnishing and installing the overhead hoisting equipment, controls, trolleys and supporting monorails in accordance with the drawings and specifications for the operation shown on the drawings and specified herein.
  - 2. All work performed under this section shall comply and be in accordance with trade approved practices and manufacturer's recommendations, including Safety Standards ASME / ANSI B30.16 "Overhead Hoists (Underhung)".

**1.3 QUALITY ASSURANCE**

- A. Standards - The overhead electric chain hoists shall conform to the following standards:
  - 1. Hoist Manufacturer's Institute (HMI)
  - 2. American National Standards Institute (ANSI)
  - 3. National Electrical Code (NEC)
  - 4. American Society of Mechanical Engineers (ASME)
  - 5. Comply with CSA Standards (when necessary to do so)
  - 6. Lifetime warranty against defective material and workmanship

**1.4 SUBMITTALS**

- A. In accordance with Division 1, submit the following:
  - 1. Manufacturer's Literature: Submit cut sheets and all necessary information to enable evaluation of product quality and performance and fulfillment of the requirements herein.
  - 2. Complete list of equipment with the manufacturer's name and model numbers.
  - 3. Shop drawings of crane, runway beam, rails, and associated supports.
  - 4. Crane cross-section sketches with all pertinent dimensions.
  - 5. Design loads.
  - 6. Manufacturer's painting and galvanizing system for cranes and monorails.



workmanship that will perform specific functions reliably and safely.

## 1.7 DELIVERY, STORAGE AND HANDLING

- A. Unloading and storage of crane shall be under the direct supervision of manufacturer.

## PART 2 – PRODUCTS

### 2.01 MANUFACTURERS

- A. All major components shall be provided by **Konecranes, Inc.**
- B. Hoists, trolleys, bridge end trucks, drives and controls shall all be from one supplier and shall meet the requirements of this specification:

### 2.02 RUNWAY ELECTRIFICATION

- A. The runway conductors shall be Figure-8, rolled stainless steel bar as supplied by Duct-o-wire Corporation. The minimum capacity of the conductor bar shall be sized to carry the necessary ampere load without undue heating.
- B. A four-conductor configuration shall be provided with all brackets, hangers, splice covers, power feeds, expansion gap assemblies and collectors as required by Conductix, Insul8 or Duct-o-wire.

### 2.03 RUNWAY BEAMS AND RAILS

- A. Runway beams shall be designed by a Registered Professional Engineer to meet the requirements of AISC and shall be supplied by the crane manufacturer.
- B. Rails shall be ASCE rails, sized according to the crane wheel loads and shall be supplied by the crane manufacturer.
- C. The runway rails shall be attached to the runway beams using hook bolts, rail clips or clamps, as determined by the crane manufacturer.

### 2.4 ELECTRICAL EQUIPMENT AND POWER SUPPLY

- A. Power supply for the hoist shall be 460-volt, 3 ph., 60 Hz. All power required for the operation of the hoist, trolley, and end trucks shall be developed from this source.
- B. Runway electrification shall be 4-bar safety type rigid conductors as manufactured by Insul-8, Duct-O-Wire Company or Wampfler. Wall mounted disconnect switch and power to runway conductors provided by Electrical Contractor.
- C. Cross bridge electrification shall be flat cable style festoon system with terminal

box, multi-conductor cord, plug connectors (when available) and accessories. Cables are to be hardwired when plug connectors are not available.

D. Controls

1. Six-way operation, plug-in pushbutton pendant suspended from independent festoon track. Radio control may be included as an option.
2. Pendant shall include Start (momentary) button, Emergency Stop (push to maintain-turn to release) that controls a mainline contactor in the bridge panel.
1. Pushbutton shall be clearly marked with hoist, trolley and bridge travel directions.
2. Hoist shall be 2 speed magnetic reversing type (standard) or variable frequency inverter control (optional) and the trolley and bridge controls shall be variable frequency inverter control (standard), as required per section 1.01.B.
3. Electrical control enclosures shall be IP55 or NEMA 4 type. Pushbutton enclosure shall be non-corrosive, non-conductive and have a rating of IP65, NEMA 4X, 4 or 5.

## 2.5 EQUIPMENT

A. HOIST & TROLLEYS

1. Under-running single girder crane shall utilize the CXT low head room trolley hoist as manufactured by Konecranes, Inc.
2. The hoist shall be equipped with an electro-mechanical load-limiting device that shall prevent lifting more than 115% of the rated load.
3. Hoist and trolley motors shall be per 1.01B above, as applicable.
4. Hoisting motor(s) shall be two-speed/two winding squirrel cage type with a speed ratio of 6:1.
5. Hoisting motor(s) shall be totally enclosed with IP55 protection, minimum class F insulation, Klixon type bimetal switch for thermal protection and shall have a 60% ED rating.
6. Trolley shall be furnished with an adjustable frequency inverter drive and two-step or infinitely variable speed control for smooth acceleration and deceleration.
7. Trolley motors shall be inverter duty motors with minimum class "F" insulation and motor enclosures shall be TENV [totally enclosed non-ventilated].
8. Rotary cam type limit switch equipped with 4 micro-switches shall be

provided. Limit switch shall provide upper and lower limit of hoist travel, hoist slow down prior to reaching upper limit and phase sequence supervision at upper limit.

9. Hoist motor brake shall be DC disc type with adequate torque to stop and hold over 125% of the hoist rated load.
  10. Large diameter rope drum with minimum of 36:1 drum to wire rope diameter ration. Groove depth shall be at least 35% of rope diameter. The rope drum shall be equipped with a rope guide to help keep the rope aligned in the grooves of the drum.
  11. Wire rope shall be constructed from Stainless Steel having a minimum safety factor of 5.
  12. Hoist reeving shall be single reeved. Lateral hook drift shall not exceed 1/8 inch per foot of vertical travel on single reeved models.
  13. The hoist nameplate is to carry a CSA c/us rating. The actual hoist control enclosure rating shall be at least equivalent to IP55 / NEMA 4 type.
  14. Hooks shall be made of forged alloy steel (34CrMo4QT or 34CrNiMo6QT) and shall be fitted with a spring-loaded flipper-type safety latch.
  15. Hoist shall have a duty rating suitable for the load class and load cycles of the application (reference appendix A).
  16. AGMA quality class 12 machine cut, hardened and precision ground hoist gearing. The gears inside the hoist gearboxes on models up to 5-ton capacity are lubricated by semi-fluid grease. On models over 5-ton capacity the gears inside the hoist gearbox are lubricated with semi-fluid grease or oil.
  17. AGMA quality class 10, hardened and precision ground trolley drive gearing, lubricated by semi-fluid grease.
  18. Trolleys shall have safety drop lugs and energy absorbing bumpers.
- B. Bridge Girder
1. Bridge girder shall be per 1.01B above, as applicable.
  2. Bridge girders shall be constructed from welded box girders or Structural beams, Steel, ASTM A36 , A50 or A992, as required.
- C. End Trucks and Bridge Drive
1. End trucks shall be designed in accordance with CMAA specification as applicable for the type crane.

2. End trucks shall be bolted (not welded) to bridge girder.
3. Bridge drive shall be dual motor (A-4 arrangement per CMAA).
4. Bridge drive shall be designed to stop bridge within CMAA specifications.
5. End trucks shall be equipped with rail sweeps and energy-absorbing rubber bumpers.
6. Travel limit switches to be provided as necessary for safe operation.
7. Bridge shall be furnished with an adjustable frequency inverter drive and two-step or infinitely variable speed control for smooth acceleration and deceleration.
8. Bridge motors shall be inverter duty motors with minimum class "F" insulation and motor enclosures shall be TENV (totally enclosed non-ventilated).
9. AGMA quality class 10, hardened and precision ground bridge drive gearing, lubricated by semifluid grease.
10. Bridge girder shall be per 1.01B above, as applicable.
11. Bridge girders shall be constructed from welded box girders or Structural beams, Steel, ASTM A36 A50 or A992, as required.

### **PART 3 – EXECUTION**

#### **3.1 INSTALLATION**

- A. The Contractor shall review the dimensions of the crane and hoist shop drawing submittals as well as the basin & roof shop drawings to ensure that the crane assembly fits properly within the specified location and that there are no operating interferences.
- B. The Contractor shall install runway beams, rails, bridge crane, hoist, controls, and accessories as the building is being constructed. Mount crane plumb and square with surrounding structure.
- C. Immediately after runway beams are installed, Hoist Supplier shall survey runway beams to ensure that erection tolerances meet requirements of the CMAA Specification Number 70. If adjustments are necessary, the Contractor shall re-position runway beams to ensure smooth operation of crane.
- D. After crane system is installed, Hoist Supplier shall inspect the crane and perform start-up operations.
  1. Hoist supplier shall survey the runway beams and ASCE rails immediately after installation and perform start-up operations after full system is

installed.

E. Upon completion and before final acceptance, each hoist system shall be tested by an OSHA certified crane inspector per the State of Georgia OSHA requirements. Written documentation of the tests shall be given to the Owner. Tests shall include, but are not limited to the following:

1. Load test of 125% of rated capacity for critical positions along the full travel of the crane and hoist. Crane Supplier shall provide test weights.
2. Hoisting and lowering.
3. Trolley travel.
4. Locking and safety devices.

END OF SECTION