

## SECTION 34 21 20

### AC BUSWAYS

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. General requirements
- B. Enclosure
- C. Buses and bus connections
- D. Fittings
- E. Ac busway rating
- F. Bus supports
- G. Factory tests
- H. Installation

##### 1.02 RELATED SECTIONS

- A. Interface and coordinate the work of this Section with Section 20 70 26 - Common Materials and Methods for Electrical Systems, and Section 34 21 50 - Common Materials and Methods for Traction Power

##### 1.03 MEASUREMENT AND PAYMENT

- A. General: AC busways and associated accessories, as specified herein, will not be measured separately for payment but will be paid for as part of the Contract lump sum price for the related item of work as indicated in the Bid Schedule of the Bid Form.

##### 1.04 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI C37.23 Standard for Metal-Enclosed Bus
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA BU1 Busways
- C. Underwriters Laboratories (UL)
  - 1. UL857 Safety Busways and Associated Fittings

**1.05 SUBMITTALS**

- A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Submit the following:
  - 1. Product data for ac busways

**PART 2 – PRODUCTS****2.01 GENERAL**

- A. Aerial ac busways shall connect the outdoor rectifier transformers to the traction rectifiers installed inside the dc enclosure house, for operation as an integral unit.
- B. AC busways and associated accessories shall be of the non-segregated type.
- C. Each ac busway shall include an assembly of rigid copper conductors with associated connections, joints, insulators, bracing and supports, within a metal enclosure.

**2.02 ENCLOSURE**

- A. AC busways shall be housed in enclosure with bolted flange connection for assembly at the rectifier transformer and traction rectifier throat. The busway enclosure shall be a rigid structure, fabricated from formed steel sheets of No. 11 gauge minimum thickness.
- B. The outdoor portion of the ac busway enclosure shall be weatherproof.
- C. The ac busway enclosure shall be provided with:
  - 1. Removable gasketed covers for access to bolted bus connections and insulators, and access at the transformer connection for ease of maintenance and testing. Covers shall be secured with rust-resistant bolts to the frame of the busway.
  - 2. Space heaters as specified in Section 34 21 50 - Traction Power Materials and Devices, and provisions for draining possible condensation.
  - 3. Insulating joints at the interface with the traction rectifier, for electrical isolation from the high-resistance grounding system of the rectifier frame and structure.
  - 4. Noncombustible, weatherproof seals at each location where the busway penetrates an outside wall. The seals shall be on both sides of the wall and shall accommodate 1/2-inch differential settlement between the foundations.
  - 5. Enclosure finish shall conform to requirements of Section 34 21 05 – Prefabricated AC and DC Equipment Houses

**2.03 BUSES AND BUS CONNECTIONS**

- A. Buses and bus connections shall be as specified in Section 34 21 50, Traction Power Materials and Devices.
- B. The entire length of each bus conductor including all fittings shall be insulated individually within each busway. Insulation and insulators shall be NEMA Class B and nonhygroscopic.

**2.04 FITTINGS**

- A. AC busway assemblies shall be complete with connection flanges, seals, taps, elbows, insulated housing sections, offsets, splicing plates, terminal connectors, and associated accessories.
- B. Expansion joints shall be provided where required for normal operation of the equipment.
- C. AC busways shall be designed to minimize induced magnetic heating and induced circulating currents in the metallic enclosure of the busway, adjacent enclosures, and supporting structures.
- D. Each ac busway shall be provided with support fittings for trapeze hangers.

**2.05 AC BUSWAY RATING**

- A. AC busways shall be rated for 1,200 V ac nominal, with a continuous current rating not less than 160 percent of the continuous full-load current rating of the associated transformer/rectifier unit.
- B. The ac busway shall be capable of withstanding stresses due to a phase bolted short-circuit at the rectifier terminals, with a fault level of 1,000 MVA symmetrical on the 34.5 kV side of the rectifier transformer.

**2.06 BUS SUPPORTS**

- A. AC busway enclosures shall be supported by the transformer throat connection, the trapeze hangers inside the dc house enclosure and intermediate supports as required. If made of ferrous metal, busway enclosure components and supports shall be hot-dip galvanized. Nuts, bolts and washers shall be cadmium plated.

**2.07 FACTORY TESTS**

- A. General: Testing shall be performed in accordance with the requirements of Section 01 45 24, General Testing Requirements.
- B. Design tests shall be performed in accordance with ANSI C37.23 and UL 857 on one unit for the metal-enclosed bus, including the following:
  - 1. Dielectric tests:
    - a. Power frequency withstand voltage
    - b. Impulse withstand voltage
  - 2. Temperature rise test.

3. Momentary current test.
  4. A test to verify that the busway enclosure is watertight.
- C. Power frequency voltage withstand tests shall be performed on AC busways in accordance with the Production Tests specified in NEMA BU1 and UL 857 for metal-enclosed bus.

### **PART 3 – EXECUTION**

#### **3.01 INSTALLATION**

- A. General:
1. The physical arrangement shall permit installation or removal of throat or bus connections without moving the rectifier, transformer or switchgear.
  2. Busways shall be installed not lower than 84 inches above finished floor.
  3. The portion of the AC busway enclosure between the insulating joint at the rectifier interface and the transformer shall be connected to the substation ground mat.

**END OF SECTION 34 21 20**