

**SECTION 26 25 11
BUSWAYS**

SPEC WRITER NOTE: Delete between //----//
if not applicable to project. Also delete
any other item or paragraph not
applicable to the section and renumber
the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, connection, and testing of busways for use in electrical systems rated 600 V and below.

1.2 RELATED WORK

- A. Section 07 84 00, FIRESTOPPING: Sealing around busway penetrations to maintain the integrity of fire-resistant rated construction.
- B. Section 07 92 00, JOINT SEALANTS: Sealing around busway penetrations through the building envelope to prevent moisture migration into the building.
- //C. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Requirement for seismic restraint for nonstructural components.//
- D. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.
- E. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.
- F. Section 26 24 16, PANELBOARDS: Circuit breakers for use in plug-in busway.
- G. Section 26 29 21, ENCLOSED SWITCHES AND CIRCUIT BREAKERS: Switches and fuses for use in plug-in busway.

1.3 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

- A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, and the following requirements:

1. Shop Drawings:

- a. Submit sufficient information to demonstrate compliance with drawings and specifications.
- b. Submit the following data for approval:
 - 1) Electrical ratings, dimensions, mounting details and position, mounting method, vertical supports, materials, fire stops, and weatherproofing.
 - 2) Detailed coordinated connections to equipment terminations such as switchgear, switchboards, and transformers.
 - 3) Coordination Drawings: Submit floor plans and sections, drawn to scale. Include bus assembly layouts and relationships between components and adjacent structural, mechanical, and electrical elements. Indicate vertical and horizontal enclosed busway runs, offsets, transitions, and clearances for access above and to the side of enclosed busways. Indicate vertical elevation of busway above the floor or bottom of structure. Indicate support locations, type of support, and weight on each support.

SPEC WRITER NOTE: Include the following paragraph for projects in seismic areas of moderate-high, high and very high seismicities as listed in Table 4 of VA Handbook H-18-8, Seismic Design Requirements. Coordinate with the structural engineer.

//c. Certification from the manufacturer that representative busway has been seismically tested to International Building Code requirements. Certification shall be based upon simulated seismic forces on a shake table or by analytical methods, but not by experience data or other methods.//

2. Manuals:

- a. Submit complete maintenance and operating manuals including technical data sheets, and information for ordering replacement parts.
 - 1) Include information for testing, repair, troubleshooting, assembly, and disassembly.
- b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

3. Certifications: Two weeks prior to final inspection, submit the following.
 - a. Certification by the manufacturer that the busway conforms to the requirements of the drawings and specifications.
 - b. Certification by the Contractor that the busway has been properly installed, adjusted, and tested.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplement and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. International Code Council (ICC):
 - IBC-15.....International Building Code
- C. National Electrical Manufacturers Association (NEMA):
 - BU 1.1-10.....General Instructions for Handling,
Installation, Operation and Maintenance of
Busway Rated 600 Volts or Less
 - BU 1.2-13.....Application Information for Busway Rated 600
Volts or Less
- D. National Fire Protection Association (NFPA):
 - 70-17.....National Electrical Code (NEC)
- E. Underwriters Laboratories Inc. (UL):
 - 857-09.....Busways

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Busway shall be in accordance with NEMA and UL.
- B. Busway shall be rated as shown on the drawings.
- C. Busway shall have the following features:

SPEC WRITER NOTE: A/E shall show on drawings the type of busway, feeder type or plug-in type.

- //1. For indoor locations; //plug-in// //feeder// type, totally enclosed and moisture resistant.//
- //2. For outdoor locations; feeder type only, totally enclosed and listed for outdoor use. Plug-in busway is not allowed for outdoor installation.//

3. Short circuit current rating shall not be less than 42,000 A, or as required to withstand the available fault current shown on the drawings, whichever is higher.
 4. 3-phase, 4-wire, with full// //200%// neutral, except where 3-phase, 3-wire is shown on the drawings.
 5. Internal 50%-rated ground bus bar. Busway housing is not allowed to serve as the equipment grounding conductor.
 6. All bus bars, phase, neutral, and ground, for each busway shall be within a single housing.
 7. Bus Bars:
 - a. Shall be full round edge rectangular copper of sufficient cross-section to provide full current rating without exceeding a temperature rise of 55° C above a 40° C ambient.
 - b. Interconnection joints shall be tin or silver plated, with steel bolts, nuts, and Belleville washers.
 - c. Shall be completely insulated with flame-retardant, track-resistant, self-extinguishing insulation.
 8. Housings:
 - a. Shall be steel or aluminum, with continuous mounting rails.
 - b. Shall be thoroughly cleaned and painted at the factory with primer and the manufacturer's standard finish.
 - c. Shall have rustproof metal hardware.
 - d. Provide external flanges and weatherproofing at busway entrances to buildings.
 - e. For busways that pass through fire-resistant rated construction, incorporate listed fire stops within the busway housings and external flanges.
 - f. Install expansion fittings in the busway runs in compliance with the manufacturer's standard recommendations.
 - g. The temperature rise at any point on the housing shall not exceed 30° C above an ambient temperature of 40° C.
 9. Busway shall not be reduced in size at any point.
 10. Provide manufacturer's fittings and accessories, including but not limited to elbows, tees, tap boxes, transformer taps, end boxes, expansion fittings, offsets, adapters, hangers, and mounting hardware.
- D. Dimensions and Configuration:
1. Configure within the space designated for busway installation.

2. Coordinate busway routing with equipment installation by other trades to avoid conflicts.
3. Make final field measurements and check them with the busway coordination drawings prior to authorization of fabrication of the busways.

SPEC WRITER NOTE: Delete section below if feeder type busway is specified.

//2.2 PLUG-IN TYPE BUSWAY

- A. Plug-in busway shall be available in standard trade lengths, with plug-in openings provided on both sides of the busway sections. Plug-in covers shall prohibit dirt and debris from entering contact plug-in openings in the busway. The contact surfaces for bus plug stabs shall be tin- or silver-plated and of the same material, thickness, and rating as the phase bars. A standard housing ground connection shall be supplied in each plug-in opening.
- B. Plug-in units of the types and ratings indicated on the drawings and specifications shall be supplied. Plug-in units shall be mechanically interlocked with the busway housing to prevent their installation or removal while the switch is in the "ON" position. The enclosure of any plug-in unit shall make positive ground connection to the duct housing before the stabs make contact with the bus bars. All plug-in units shall be equipped with an interlock that can be defeated to prevent the cover from being opened while the plug-in unit is in the "ON" position, and to prevent accidental closing while the cover is open. The plug-in units shall be provided with a means for padlocking. The operating handle and mechanism shall remain in control of the plug-in unit at all times, permitting easy operation by means of a hook stick or chain. All plug-in units shall be interchangeable without alteration or modification of plug-in busway.
- C. Fusible-type plug-in units shall have a quick-make/quick-break disconnect switch and positive pressure fuse clips. Provide fuses as specified in Section 26 29 21, ENCLOSED SWITCHES AND CIRCUIT BREAKERS, and as shown on the drawings.
- D. Circuit breaker-type plug-in units shall have an interrupting rating of not less than [____] symmetrical RMS amperes, as shown on the drawings. All circuit breaker plug-in devices shall be of the same manufacturer as the busway. Circuit breakers shall be as specified in Section 26 24 16, PANELBOARDS.//

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Installation shall be in accordance with the NEC, as shown on the drawings, and manufacturer's instructions.
- B. Support busways as required by the NEC and as required by manufacturer's shop drawings.
- //C. In seismic areas, busway shall be adequately anchored and braced per details on structural contract drawings to withstand the seismic forces at the location where installed.//
- D. Coordinate all of the busway terminations to equipment to ensure proper phasing.
- E. Tighten bolted connections with a torque wrench to values as required by the manufacturer.
- F. Install expansion fittings at locations where busways cross building expansion joints. Install at other locations so distance between expansion fittings does not exceed manufacturer's recommended distance between fittings.
- G. Install fire-stop assemblies per Section 07 84 00, FIRESTOPPING where busways penetrate fire-resistant construction.
- H. Install weatherproofing fittings and flanges where busways penetrate exterior elements such as walls or roofs. Seal around openings to make weathertight according to Section 07 92 00, JOINT SEALANTS.

3.2 ACCEPTANCE CHECKS AND TESTS

- A. Perform manufacturer's required field tests in accordance with the manufacturer's recommendations. In addition, include the following:
 - 1. Visual Inspection and Tests:
 - a. Compare equipment nameplate data with specifications and approved shop drawings.
 - b. Inspect physical, electrical, and mechanical condition.
 - c. Verify appropriate anchorage, required area clearances, and correct alignment.
 - d. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method, or performing thermographic survey after energization.
 - e. Verify appropriate equipment grounding.
 - f. Examine outdoor busways for removal of weep-hole plugs, if applicable, and the correct installation of joint shield.
 - 2. Electrical Tests:

- a. After installation, test busway phase-to-phase and phase-to-ground resistance with an insulation resistance tester.

Resulting values shall not be less than one megohm.

3.3 FOLLOW-UP VERIFICATION

- A. Upon completion of acceptance checks and tests, the Contractor shall show by demonstration in service that the busway is in good operating condition and properly performing the intended function.
- B. After the busways have been energized for a minimum of 30 days, repeat the torque wrench tightening of all bolt connections.

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