

SECTION 26 05 48.00 10

SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT
10/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 325 (2005) Manual of Steel Construction

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-310-04 (2007) Seismic Design for Buildings

UNDERWRITERS LABORATORIES (UL)

UL 1598 (2008; Rev thru Nov 2008) Luminaires

1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

The requirements for seismic protection measures described in this section shall be applied to the electrical equipment and systems listed below. Structural requirements shall be in accordance with Section 13 48 00 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT.

1.2.2 Electrical Equipment

Electrical equipment and systems shall include the following items to the extent required on the drawings or in other sections of these specifications:

Control Panels	Dry Type Transformers
Pumps with Motors	Overhead Conduit Racks
Light Fixtures	Uninterruptible Power Supplies
Motor Control Centers	(floor mounted)
Active Harmonic Conditioners	Variable Frequency Drives
Switchboards	(floor mounted)

1.2.3 Electrical Systems

The following electrical systems shall be installed as required on the drawings and other sections of these specifications and shall be seismically protected in accordance with this specification:

Wall bracket-mounted cable tray systems

Suspended-mounting cable tray systems.

1.2.4 Contractor Designed Bracing

The Contractor shall design the bracing in accordance with UFC 3-310-04 and additional data furnished by the Contracting Officer. Resistance to lateral forces induced by earthquakes shall be accomplished without consideration of friction resulting from gravity loads. UFC 3-310-04 uses parameters for the building, not for the equipment in the building; therefore, corresponding adjustments to the formulas shall be required. Loadings determined using UFC 3-310-04 are based on strength design; therefore, AISC 325 shall be used for the design. See Submittal requirements for calculations. The bracing for the following electrical equipment and systems shall be developed by the Contractor: All those items listed in Article 1.2.2 ELECTRICAL EQUIPMENT.

1.2.5 Conduits Requiring No Special Seismic Restraints

Seismic restraints may be omitted from electrical conduit less than 2-1/2 inches trade size and less than 20 feet in length. All other interior conduit, shall be seismically protected as specified.

1.3 EQUIPMENT REQUIREMENTS

1.3.1 Rigidly Mounted Equipment

The following specific items of equipment: Below to be furnished under this contract shall be constructed and assembled to withstand the seismic forces specified in UFC 3-310-04. Each item of rigid electrical equipment shall be entirely located and rigidly attached on one side only of a building expansion joint. Piping, electrical conduit, etc., which cross the expansion joint shall be provided with flexible joints that are capable of accommodating displacements equal to the full width of the joint in both orthogonal directions.

- Dry-Type Transformers
- Switchboards
- Motor Control Centers
- Active Harmonic Conditioners
- Uninterruptible Power Supplies (floor mounted)
- Variable Frequency Drives (floor mounted)
- Control Panels

1.3.2 Nonrigid or Flexibly-Mounted Equipment

The following specific items of equipment to be furnished: Below shall be constructed and assembled to resist a horizontal lateral force of 2 times the operating weight of the equipment at the vertical center of gravity of the equipment.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Lighting Fixtures in Buildings

Equipment Requirements
Contractor Designed Bracing; G, AE

Detail drawings along with catalog cuts, templates, and erection and installation details, as appropriate, for the items listed. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation with relation to the building construction.

SD-03 Product Data

Lighting Fixtures in Buildings; G, AE
Equipment Requirements; G, AE

SD-05 Design Data

Calculations; G, AE

Structural calculations for bracing members, their connections and equipment anchorages shall be stamped and signed by a registered Civil or Structural Engineer currently licensed in the State of California. Calculations shall also verify the capability of structural members to which the bracing is attached for carrying the load from the brace. Design criteria is as stated on Drawing G-10, Structural Construction Notes.

PART 2 PRODUCTS

2.1 LIGHTING FIXTURE SUPPORTS

Lighting fixtures and supports shall conform to [UL 1598](#).

2.2 SWAY BRACING MATERIALS

Sway bracing materials (e.g. rods, plates, angles, etc.) shall be as specified in Section [13 48 00 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT](#).

PART 3 EXECUTION

3.1 SWAY BRACES FOR CONDUIT

Conduit shall be braced as for an equivalent weight pipe in accordance with Section [13 48 00.00 10 SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT](#).

3.2 LIGHTING FIXTURES IN BUILDINGS

Lighting fixtures and supports shall conform to the following:

3.2.1 Pendant Fixtures

Pendant fixtures shall conform to the requirements of [UFC 3-310-04](#).

3.2.2 Ceiling Attached Fixtures

3.2.2.1 Recessed Fluorescent Fixtures

Recessed fluorescent individual or continuous-row mounted fixtures shall be

supported by a seismic-resistant suspended ceiling support system built in accordance with Section 09 51 00 ACOUSTICAL CEILINGS. Seismic protection for the fixtures shall conform to the requirements of UFC 3-310-04. Recessed lighting fixtures not over 56 pounds in weight may be supported by and attached directly to the ceiling system runners using screws or bolts, number and size as required by the seismic design. Fixture accessories, including louvers, diffusers, and lenses shall have lock or screw attachments.

3.2.2.2 Surface-Mounted Fluorescent Fixtures

Surface-mounted fluorescent individual or continuous-row fixtures shall be attached to a seismic-resistant ceiling support system built in accordance with Section 09 51 00 ACOUSTICAL CEILINGS. Seismic protection for the fixtures shall conform to the requirements of UFC 3-310-04.

3.2.3 Assembly Mounted on Outlet Box

A supporting assembly, that is intended to be mounted on an outlet box, shall be designed to accommodate mounting features on 4 inch boxes, plaster rings, and fixture studs.

3.2.4 Wall-Mounted Emergency Light Unit

Attachments for wall-mounted emergency light units shall be designed and secured for the worst expected seismic disturbance at the site.

3.2.5 Lateral Force

Structural requirements for light fixture bracing shall be in accordance with Section 13 48 00 SEISMIC PROTECTION FOR MISCELLANIOUS EQUIPMENT.

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